Kyoto Mechanisms Table

Options Paper

October 22, 1999

PARTICIPANTS

Co-chairs

Yaprak Baltacioglu
Environment Canada

Chris Peirce
AT&T

Members

Jean-Luc Allard
SNC Lavalin

David Baird
Bronson Consulting Group

David Bazeley
Government of Newfoundland & Labrador

Warren Bell/ Shelley Murphy
B.C. Ministry of Environment, Lands & Parks

Doug Bruchet
Canadian Energy Research Institute

Jean Cooper/ Paul Samson/ Eric Landry
Natural Resources Canada

Nancy Coulas/Jason Myers
Alliance of Manufacturers and Exporters of Canada

André Couture
Ministère de l'environnement du Québec

John Dillon
Business Council on National Issues

Joseph Doucet
GREEN, Université Laval

John Drexhage
Environment Canada

André Duchesne
Association des industries forestières du Québec

Members (continue)

Christine Elwell
Sierra Club

Sheldon Fulton
AgraLinks Exchange

Daniel Gagnier/ Hugh Porteous/ Fraser Thomson
Alcan

Luc Gagnon / Jean-Étienne Klimpt/ Dominique Égré
Hydro Québec

Donald Gilchrist
University of Saskatchewan

Jack Jenkins/ Al Glasgow/ Leah Lawrence
TransCanada Pipelines Ltd.

Thomas Gorman
Cameco

Bill Hamlin
Manitoba Hydro

Doug Harper
Ontario Ministry of the Environment

Robert Hornung
Pembina Institute for Appropriate Development

Rick Hyndman
University of Alberta

Colin Isaacs
Contemporary Information Analysis Ltd.

David Drake/ Sushma Gera/ Ted Ferguson/ Carolyne Luce/ Alain Richer/ Satender Singh
Dept. of Foreign Affairs and International Trade

Brian Jantzi/ Corinne Boone/ Anda Kalvins
Ontario Hydro

Phil Jessup/ Gabriella Kalapos
International Council for Local Environmental Initiatives

Members (continue)

Gordon Lambert
Suncor Energy Inc.

Jean-François Lefebvre/ Marie-Christine Dubé
Groupe de recherche appliquée en macroécologie

Michel Lesueur
Ministères des ressources naturelles, Québec

Don MacDonald/ Grant Hilsenteger
Alberta Department of Energy

Scott McDougall
Jacques Whitford

Kathleen McGrath
Department of Finance

Ron Nielsen
Pollution Probe/ Alcan

Joel Nodelman
Edmonton Power Corp. (EPCOR)

Jean-Pierre Pilon
Gaz Métropolitain

John Railton
Agra Earth Environmental

Lynne Ree
Canadian Steel Producers Association

Don Reimer/ Randal Goodfellow
CanAlta Wind Energy Coalition

John Rich
B.C. Hydro

Ross Risvold
Town of Hinton

Steve Rive
Toronto Futures Exchange

Chris Rolfe
West Coast Environmental Law Research Foundation

Members (continue)

David Runnalls/ Jim Leslie
International Institute for Sustainable Development

Bill Singleton/ Gerry Collins
CIDA

Thomas Storring
Ontario Ministry of Finance

Richard Williams
WestCoast Energy Inc.

Ross Young
Nova Scotia Power

Observers

Normand Tremblay/ Ellen Burack
Climate Change Secretariat

Hélène Careau
Ministère de l'industrie et du commerce du Québec

Nada Vrany/ Meghan Sulatisky
Industry Canada

Writers

Michael Walsh
Environmental Financial Products

Doug Russell
Global Change Strategies International

Secretariat

Bruno Jacques
Environment Canada

Dannielle Parent
Environment Canada

Wayne Moore
Environment Canada

Table of Contents

Executive Summary v

The Table's Vision for the Kyoto Mechanisms vi

Issues Specific to the Mechanisms vi
Cross-cutting Issues vi
Issues Specific to Emissions Trading ix
Issues Related to CDM/JI x
Policy and Implementation Linkages xii
Further Analysis xiii

1. Introduction 1

1.1 Rationale for Flexibility 2

1.2 Market Mechanics, Linkage With Domestic Implementation 3

2. The Table's Vision for the Kyoto Mechanisms 6

2.1 Specific Vision for Each Mechanism 6

3. Cross-cutting Issues 8

3.1 The Private Sector 8

3.2 Fungibility Among the Three Kyoto Mechanisms 8

3.3 Rules Governing Reporting and Verification, Eligibility to Trade for Annex I Parties, the Compliance and Enforcement Regime, Liability Rules 10
a) Reporting and Verification Guidelines on the Transfer of Parties' Assigned Amounts : 10
b) Rules Governing Eligibility to Trade for Annex I Parties 10
c) The Compliance and Enforcement Regime 11
d) Liability for Excessive Sales 12

3.4 Supplementarity 15

3.5 Carbon Sinks 16

4. Other Issues Identified by the Table 18

4.1 "Hot Air" 18

4.2 Competitive Access to the Kyoto Mechanisms 19

4.3 Institutions 20

5. Issues Related to the "Project Based" Mechanisms : CDM and JI 21

5.1 Transaction Process 21

5.2 Project Approval/Sustainable Development 24

5.3 Quantifying Emission Reductions : Additionality and Baselines 25
a) Additionality 25
b) Emission Baselines 26

5.4 Project Accountability 29
5.5 Transaction Costs and Risks 29
5.6 CDM Fees 30
6. Linkages to Domestic Process 32
6.1 General Linkages 32
a) Preparing for Use of the Mechanisms 32
b) Registries 33
c) International Trade Issues, Treatment of Multinational Firms 33
6.2 Implications for Canada's National Implementation Strategy 34
Appendix A : Annex B countries and their GHG emission reduction commitments under the Kyoto Protocol 36
Appendix B : Background 37
International Context 37
Existing Experience with Emissions Trading : 37
Mechanics of DET : 38
Assessment of Canada's Situation : 39
Appendix C : Terminology 44
References 47

List of Tables

Table 1 : Elements of Effective Market-based Environmental Protection Programs, Provisions of the Kyoto Protocol and Market Elements 3
Table 2 : One Scenario of the Five-year Total Value of Canada's International GHG Emissions Trading 41
Table 3 : Projected emission account shortfalls and surpluses, calculated as the difference between projected "business as usual" emissions and the Kyoto target 42

List of Figures

Figure 1 : Overall Structure Provided by the Kyoto Mechanisms, Key Issues 5
Figure 2 : Elements of the CDM and JI Project Implementation Process 23

Kyoto Mechanisms Table Options Report

Executive Summary

The mandate of the Kyoto Mechanisms (KM) Table was to provide advice to Ministers, government officials and interested stakeholders on Canada's strategic interests related to the Kyoto Mechanisms[1] and, in particular, positions Canada should take on the elaboration of international market-based Mechanisms (or Kyoto Mechanisms) found in the Kyoto Protocol – Joint Implementation (JI), the Clean Development Mechanism (CDM) and Emissions Trading (ET). The Table had also been requested to consider domestic - international linkages on the Mechanisms, looking at the implications of international decisions on our domestic options and the impact of domestic actions on the international scene. The Table worked hard to identify points of convergence but where this was not possible, the full range of views is reflected.

The Table was comprised of approximately 45 members, representing federal and provincial governments, industry, business, environmental groups, and experts.

The KM Table developed the following principles to guide its work :

- ***Environmental Effectiveness*** : the Mechanisms should not compromise the overall net emissions target of 5.2% below 1990 levels for Annex I countries ;
- ***Economic Efficiency*** : the Mechanisms should enable the achievement of the emission reduction at the least possible cost ;
- ***Flexibility*** : the Mechanisms should allow for temporal, geographical and sectoral flexibility in achieving reductions in net emissions ;
- ***Balanced Approach*** : decisions reached internationally on the Mechanisms should not compromise Canada's international competitiveness, trade balance or its regional economies ;
- ***Engagement of Developing Countries*** : the Mechanisms should be designed to encourage the active engagement of developing countries ;
- ***Sustainable Development*** : the Mechanisms should contribute to the achievement of sustainable development of all Parties ;
- ***Clarity and Simplicity*** : the Mechanisms should be designed to minimize complexity and should be easy to understand.

It should be borne in mind that the international negotiations are at a dynamic stage, with decisions expected on a framework for the Mechanisms at the Sixth Conference of the Parties (CoP 6) to the United Nations Framework Convention on Climate Change (UN-FCCC) - to be held either in the fall of 2000 or the spring of 2001. Hence the positions promoted in these conclusions should be seen as a 'snapshot' of our views on the issues as they currently stand. Undoubtedly, between now and CoP 6 we will witness an evolving set of domestic and international circumstances that will call for an appropriate Canadian response. In that respect, the Table strongly recommends that consultations with key and interested stakeholders on the status of international negotiations continue to be held regularly.

[1] Specialized terms are defined in the Appendix C for readers who are less familiar with the mechanisms' vocabulary.

The first part of this report, consisting of sections 1 and 2, introduces the concept of the Mechanisms, reviews the rationale for market-based Mechanisms and discusses practical experience with emissions trading. The second part of the report, consisting of sections 3, 4 and 5, addresses issues specific to the Mechanisms and covers cross-cutting issues, such as the role of the private sector ; reporting and verification guidelines ; fungibility ; rules governing eligibility to trade for Annex I Parties ; compliance and enforcement regimes ; supplementarity ; and liability. It also covers issues specific to emissions trading such as "hot air" ; and competitive access to the Mechanisms. Section 5 also covers issues relevant to project-based activities, covering the Clean Development Mechanism and Joint Implementation, including eligibility criteria ; additionality ; baselines ; and transaction fees. The third part of the report, Section 6, discusses linkages to domestic policy and, in particular, the potential role for the Kyoto Mechanisms in the National Implementation Strategy.

The Table's Vision for the Kyoto Mechanisms

All Table members agreed that the ideal framework for the Mechanisms would be one which is environmentally credible, economically efficient and competitive, with a transparent and predictable market involving a large number of participants, and be administratively simple.

Project-based activities should both promote greenhouse gas reductions and/or an enhancement of carbon removals by sinks and contribute to sustainable development in less developed countries, including countries whose economies are in transition. JI and the CDM should also provide access to low cost emission reduction units through a process that has low transaction and administrative costs, and is as simple, consistent and predictable as possible. The system should allow for the maximum possible range of environmentally credible projects that contribute to the Protocol objectives while building and rewarding participation by all countries in the needed global effort to combat climate change.

In general, Table members wished to underline the critical role that the Mechanisms will play in ensuring that :

- the Protocol will eventually come into force internationally ;
- Annex B Parties meet the reduction targets they agreed to at Kyoto ;
- the private sector has access to low cost solutions ;
- Canada is provided an opportunity to meet its Kyoto target in a cost-effective manner in a way that also works to promote sustainable development ; and
- the Clean Development Mechanism contributes to sustainable development in developing countries.

Issues Specific to the Mechanisms

Cross-cutting Issues

The private sector :

- **Issue** : What is the role of the private sector in the Kyoto Mechanisms?
- **Strategic Considerations :** As the vast majority of emissions in Canada are from non-government sectors it is important that the private sector be engaged in the design of policies and measures to reduce Canada's emissions, including the Kyoto Mechanisms.
- **Conclusions :** Table members strongly support the view that the private sector needs to play a significant role in the

development and implementation of the Mechanisms. Strong private sector participation is critical in helping to ensure that :

- use of cost effective opportunities are maximized ;
- the Kyoto Mechanisms operate in an international market that provides for competitive access to net emission reduction opportunities.
- use of the Mechanisms can be integrated effectively into the operations and procedures of Canadian firms.

Hence, it will be critical to ensure that eligibility criteria developed for the Mechanisms provide for the broadest possible engagement of non-government entities in Joint Implementation, the Clean Development Mechanism and Emissions Trading. It is critical to establish a practical, workable system that encourages private sector participation.

Governments can play a useful role in helping the private sector become engaged in the Mechanisms by identifying and facilitating opportunities overseas and by providing support for Canadian business, including facilitation of Canadian participation in emissions trading.

Fungibility :

- **Issue :** Fungibility is the degree to which emission units issued or acquired under each Mechanism would be interchangeable.
- **Strategic Considerations** - a fully fungible international regime for the Mechanisms will play a critical role in working to augment the overall commercial viability of all three Mechanisms by maximizing flexibility, providing access to low cost emission reduction opportunities and lowering transaction costs. Depending on their design, rules related to liability, supplementarity and project-based credits could reduce fungibility. Demonstrating that the economic interests of developing countries would be better served under a regime that allowed for unimpeded fungibility between all three Mechanisms (by helping assure full value for Certified Emission Reductions (CERs), thus encouraging investment in CDM projects) could help build support in that group for appropriate decisions on Emissions Trading and Joint Implementation.
- **Conclusions :** Table members support the concept of fungibility whereby emission units from the Mechanisms are fully interchangeable, regardless of the country, entity, or project from which they originated and regardless of the identity of the issuer or purchaser involved in the transaction. It was also noted that such a system could only be credible if there was consistent reporting of emissions and monitoring of projects under each Mechanism and an effective liability and compliance regime was in place.

Reporting and verification guidelines on the Transfer of Parties' Assigned Amounts :

- **Issue :** As required under the Kyoto Protocol, governments are required to report changes in their assigned amount resulting from transactions under the Mechanisms. All such reporting shall also be subject to verification as provided for under Article 8 of the Kyoto Protocol.
- **Strategic Considerations :** Reporting, monitoring and verification guidelines

are a critical component in the negotiations on the Mechanisms since they are necessary to demonstrate the environmental integrity of the trading system. Table members did note that this is an important area of convergence between the EU, Umbrella Group members and the G-77 and China.

- **Conclusions :** Table members agreed that comprehensive, credible and transparent reporting, monitoring and verification guidelines need to be developed for the Mechanisms. Having such guidelines in place, implemented equally for all Parties and their entities, would be essential in demonstrating the environmental credibility and competitive robustness of the Mechanisms.

Rules Governing Eligibility to Trade for Annex I Parties :

- **Issue :** Should there be a set of rules and guidelines that Parties need to meet before they can participate in the Mechanisms, and if so, what are they?
- **Strategic Considerations :** While an internationally established set of criteria for participation is necessary for the overall credibility of the regime, too prescriptive a system will raise transaction costs and deter investments in the Mechanisms.
- **Conclusions :** The Table agrees that in order to participate in emissions trading, Parties, at a minimum, need to meet provisions under Articles 5 and 7 and have a national registry in place. In regards to the latter, the Table agreed that one international registry would not be preferred, but that an internationally agreed set of guidelines for national registries should be developed in order to allow for an accurate accounting of international transfers. The Table agreed that national guidelines for a registry and for entities to report their net emission reduction activities abroad will need to be developed in relatively short order. Finally, the implications of eligibility rules for legal entities is an important issue that should be further evaluated.

The Compliance and Enforcement Regime :

- **Issue** : What will be the linkage of the eventual compliance regime under the Kyoto Protocol with the Kyoto Mechanisms. Decisions on the Mechanisms and the compliance regime under the Kyoto Protocol are expected at CoP 6.
- **Strategic Considerations :** Although detailed discussions are only just beginning, compliance will have an important role to play in the negotiations. In order for Canada to make best efforts to meet its Kyoto objective, it is incumbent that its major trading partners, particularly the US, also make concomitant efforts.
- **Conclusions :** The Table recognized that this is a critical issue and strongly urged negotiators to keep all potential links in mind as negotiations on the Mechanisms and compliance evolve. Table members also agreed that a strong, transparent, equitable compliance regime would address concerns over the potential for unfair economic benefit arising from non-compliance and would also work to ensure that the environmental integrity of the Protocol is maintained. The Table also concluded that it is critical to establish a practical, workable system that does not unfairly impact the private sector.

Liability Rules :

- **Issue :** Which Party is responsible when sales of emission units are not backed by sufficient emission reductions in the country from which the sales originated?
- **Strategic Considerations** : As Canada will likely be a net purchaser in trading, it will be important that there be a strong assurance that credits or units being purchased can be used, at full value, towards meeting Canada's Kyoto target.
- **Conclusions** : The Table expressed a preference for the seller liability system, provided there is a strong compliance regime that effectively addresses cases of excess selling. The Table recognized that seller liability offers greater market flexibility and minimizes transaction costs. If the compliance regime is not sufficiently strong, some sort of hybrid liability system such as a "traffic light" (signaling whether to proceed, proceed with caution/ some constraints, or stop altogether) may be required.

Supplementarity :

- **Issue :** Should there be a legally binding quantitative limit on the extent to which Annex I Parties can make use of the Kyoto Mechanisms towards meeting their Kyoto targets?
- **Strategic Considerations** : The issue holds strategic importance as any actions to formalize restrictions on trading inhibit Canada's ability to access an effective and efficient international emissions trading market. In addition, if supplementarity is made operational through quantified limits on use of the Kyoto Mechanisms, the fundamental principle that Canada should be free to determine its optimal action plan for complying with its commitments would be compromised. Even though Canada's intention is to aim to achieve the majority of its emission reductions domestically, an internationally imposed cap could increase the overall cost of compliance, create differences between domestic and international emission market prices and could also work to limit investments, via the CDM, in developing countries.
- **Conclusion :** It was not possible to reach a consensus around the Table on this issue. Most Table members expressed the view that a cap would raise the overall costs of compliance. At the same time, number of environmental groups support an internationally binding cap on trading since they believe a cap would address concerns about the environmental integrity of the Mechanisms and that a cap would also provide economic and ancillary environmental benefits for Canada. Others felt that a cap on use of the mechanisms is not the best way to achieve these ancillary benefits. Many Table members argued that governments should be free to set a national implementation strategy that would not unduly constrain development of an efficient market. All Table members did agree that the EU proposal was not acceptable as it, in effect, does not cap the use of the Kyoto Mechanisms by most EU Parties.

<u>Issues Specific to Emissions Trading</u>

"Hot Air" :

- **Issue :** Should actions be taken to limit countries' ability to sell surpluses on the emissions trading market that are solely the result of 'soft targets'?
- **Strategic Considerations :** There is a growing concern among members of the environmental community that the Kyoto targets could be met by, for example, purchasing 'paper credits' from countries

such as Russia and the Ukraine which, in turn, would allow for smaller emission reductions by other Annex B Parties. This concern continues to grow as the economies in the Former Soviet Union tend to contract and as other Annex B emissions continue to increase. There is also a concern that this sets a precedent for developing countries to take on loose targets so that they can also gain commercial benefit in emissions trading (tropical hot air). However, the only meaningful solution to the issue is to re-negotiate the targets agreed to at Kyoto, a road that no one wants to go down. It is also not clear why Russian reductions represent 'hot air' while reductions that occurred for similar reasons in Germany, and from which other EU members have benefited, do not.

- **Conclusions** : Environmental representatives support the view that the issue needs to be addressed if the Protocol is to be credible. Industry representatives and others noted that most proposed solutions (e.g., capping trade from specific Parties) will only work to detract from the robustness of the Mechanisms. It was agreed that there should be further study of recent proposals that proceeds from sales of surplus emission units arising from "hot air" be used towards related climate change activities. It was also recommended that further analysis explore methods for ensuring that future developing country commitments are not too 'loose' : for example, could a credible set of international criteria for establishing initial commitments be developed and if so, what would they be?

Competitive Access to the Kyoto Mechanisms :

- **Issue** : How to ensure that all participants in the Kyoto Mechanisms have equitable and unimpeded access to the markets created by the Mechanisms.
- **Strategic Considerations** : Concerns have been expressed that large Party to Party bilateral transactions may limit opportunities for smaller players to take advantage of the Mechanisms. At this point only the EU has submitted a proposal to deal with this issue - it calls for prior notification of all emissions trading transactions.
- **Conclusions** : While there was agreement on the potential concern this issue may represent, the degree of seriousness is still unknown, nor whether it would best be addressed through the Kyoto Protocol or through other fora, such as the WTO. It was also noted that there is a larger competitiveness issue that must be addressed, but is clearly outside the scope of this Table : What are the potential trade and competitiveness implications of actions taken by Annex B Parties to meet their Kyoto commitments?

<u>Issues Related to CDM/JI</u>

Transaction Process :

- **Issue** : What will be the process for implementing project based activities under the Kyoto Protocol?
- **Strategic Considerations** : How the approval process works, including agreeing on the institutions responsible for registering and identifying projects, will have a large impact on the attractiveness of the project-based Mechanisms. Such decisions will have a direct bearing on overall transaction costs for the Mechanisms and may also influence the environmental integrity of project-based mechanisms. It should

also be noted that transaction costs could differ between JI and the CDM for at least two reasons : first, Article 12 calls for the establishment of an Executive Board and operational entities, which may work to increase overall transaction costs for the CDM. Second, some Parties believe that guidelines for establishing additionality would be less onerous for JI than for CDM, since overall Annex I emissions are not affected by JI trades. If that were the case, then overall transaction costs would likely be higher for the CDM.

- **Conclusion :** While the Table did not agree to any specific suggestions, it did call for creative solutions that ensured that the approval process is not too cumbersome or bureaucratic. Members agreed that low transaction costs throughout the process are desirable. They also agreed that it would be particularly important to ensure that guidelines established for the implementation of the CDM are kept at a credible minimum in order to ensure that transaction costs do not compare too unfavourably with those under Joint Implementation. Members also noted the importance of having Canadian representation on those bodies which would oversee project activities. The majority of Table members also believed that the host country should determine whether a proposed project meets its sustainable development criteria and that a pre-approved list of project types, while attractive in providing predictability to the process, may also limit Canadian opportunities in, for example, sink investments.

Additionality :

- **Issue :** As required under Articles 6 and 12 of the Protocol, it may be necessary to establish a process for demonstrating that a particular project is additional to what would have otherwise occurred.
- **Strategic Considerations** : While the key concern is to ensure that the environmental integrity of the investment is maintained, it was also agreed that specific language on how additionality could be demonstrated would be difficult to establish or may prove to be so limiting that it would compromise the overall attractiveness of project-based activities for potential investors.
- **Conclusions** : The Table noted that this is a critical issue on which Canada should take leadership in attempting to define additionality in concrete terms. More specifically, environmental groups stated that financial (Official Development Assistance and other financial considerations) and technological additionality also need to be addressed, while industry and other members felt strongly that only environmental additionality should be a concern.

Emission Baselines :

- **Issue :** What is the optimum design option for determining emission baselines?
- **Strategic Considerations :** This is a critical issue as credible baselines will work to ensure the environmental integrity of each project while helping to maintain the integrity of the whole system. There are a number of options for defining a baseline, including project-by-project baselines, sectoral baselines, baselines based on matrices summarizing "available technology" by sector and country, and benchmarks.
- **Conclusions :** The Table advocated a flexible approach where the investor and

host countries alike can choose the most appropriate baseline approach based on the specific circumstances of the project. In choosing one baseline method over another, consideration must be given to the degree to which the environmental goals are being met ; costs are being minimized ; the availability of appropriate data/information ; the practicality and credibility of the methodology ; and, the technology available to measure the baseline.

CDM Fees :

- **Issue :** Article 12.8 provides that a share of proceeds from CDM projects be used to cover administrative expenses and to assist in meeting adaptation costs for particularly vulnerable countries. The level and method used to collect these fees will impact the level of use of the CDM.
- **Strategic Considerations :** The nature and level of the payment could have a large bearing on the attractiveness of the CDM to potential investors. The Table considered four levy forms : percentage of gains from trade ; percentage of CER sales price ; flat per tonne fee levied upon issuance or first transfer of CERs ; or a portion of the CERs earned by a project. The G-77 and China strongly support collecting adaptation fees through levies on all three Kyoto Mechanisms.
- **Conclusions :** The Table agreed that the overall goal is to foster more project activity to improve the environment, contribute to sustainable development, and transfer more technology. Hence it is important to ensure that the adaptation fees are not set at levels that would significantly decrease CDM investments in developing countries. Of the four design options considered, the Table preferred paying the fees by collecting a share of earned CERs, but thought that a more creative solution could be devised. Some environmental groups also noted their preference for an 'adaptation fee' to be collected via levies on all three Mechanisms, not just the CDM. It is generally agreed that the adaptation fund will need financial resources beyond the funds collected through fees on the CDM.

Policy and Implementation Linkages

International negotiations on the Kyoto Mechanisms are intimately related to negotiations on the other issues such as reporting, compliance, non-compliance sanctions, and carbon sinks. Rules on these other parts of the Protocol will influence how the Mechanisms would be used. Therefore, it is crucial that these components benefit from a comprehensive approach.

These international negotiations may also have significant implications for the domestic implementation strategy.

Domestic Policy Implications :

- **Issues :** How will the international negotiations shape domestic policy?
- **Strategic Consideration :** The domestic implementation strategy and, eventually the ratification decision, will be to some measure contingent on the outcome of the negotiations. Continuous feedback will help Ministers and officials strengthen and make more specific the National Implementation Strategy.
- **Conclusions :** The nature of international rules around the Mechanisms will have an impact on domestic policy choices. One of the key considerations is that the evolution of domestic policy will need to take into

account international guidelines that define the parameters and roles of domestic activities, covering for example, the scope of sink activities that can be used towards meeting our Kyoto commitments. In regards to the Mechanisms, specific issues of concern that will have significant impacts for the domestic national implementation strategy include international decisions to be made on : supplementarity ; 'hot air' ; transaction costs ; compliance provisions ; and the role of sinks in the CDM.

Preparing for the Kyoto Mechanisms?

- **Issues :** What specific actions might be undertaken to prepare Canadians and Canadian industry for a "Kyoto Mechanism" world?
- **Strategic Considerations :** It is important to recognize that early signals and actions domestically will help position Canada for a future world in which Kyoto Mechanisms will play an active role in managing greenhouse gas emissions.
- **Conclusions :** The Table recognized that a Canadian program that gives credits for early and verifiable actions to reduce or capture greenhouse gas emissions could stimulate trading domestically and internationally and could be an effective method for gaining the experience needed to effectively use the international Mechanisms. Table members recommended maintaining an explicit link with the work being done by the Credit for Early Action Issue Table and the Tradeable Permits Working Group in order to achieve compatibility among domestic and international market-based mechanisms.

In addition, further consultations are required between governments, industry and Environmental NGO's to clarify what support and collaboration will be required to get the private sector more fully engaged in the opportunities afforded by the Kyoto Mechanisms. Preparing for a Kyoto Mechanisms regime will also require specific actions in the following areas :

- Targeted countries for CDM and JI projects ;
- Building private sector capabilities by sharing ideas and experience with the Mechanisms and by showing leadership ;
- Registry design and operation
- Policy design activities and administrative systems in federal and provincial governments ;
- Understanding baselines and additionality through workshops, practical examples and research ;
- Developing definitions, measurement methodologies, monitoring for carbon sinks.

Further Analysis

Throughout the Table process, it became increasingly apparent that the roles and responsibilities of private sector entities needs considerably more attention. While the Table agreed that the vast majority of this work was not directly relevant for the international negotiations, it was also clear that a number of issues relevant to entity level participation need to be addressed for the Mechanisms to become an active part of the National Implementation Strategy. Such issues include, but are not limited to, entity level liability ; the link of entity participation in the Mechanisms with international compliance provisions for governments ; and reporting requirements for national registries.

Other areas warranting further analysis

include, but are not limited to, defining, in concrete terms, additionality provisions ; how best to address concerns on ensuring equitable access to emissions trading ; and defining an acceptable compliance regime for Canada. Developing country issues that warrant further analysis include global and regional equity impacts ; the role of capacity building and foreign assistance, including the roles of ODA and the Global Environment Facility ; the role of CIDA and DFAIT in capacity building and issues related to South-South transactions under the CDM.

In addition, because international trade is a major concern to Canada, the Table identified this topic area as one in urgent need of further analysis. It was recommended that a specific programme of analytical work to address these concerns be undertaken.

Major areas of concern include :

- the linkage between use of the Kyoto Mechanisms and the broader system of rules governing international trade, in particular the WTO ; and
- competitiveness of Canadian industry and Canadian emissions trading policies (both domestic and international trading) in light of actions taken by the United States.

The development of the Kyoto Mechanisms, including their linkages to domestic processes, raises significant public interest and private sector issues. In order to address key principles espoused to date in the discussions of these issues, including cost effectiveness, environmental integrity and credibility as well as transparency, it will be necessary to ensure that there is opportunity for the various interests to comment on and participate in the development of these Mechanisms in the Canadian context. Thus, alongside governments, other stakeholders including the private sector and public interest organizations should have appropriate opportunity to participate in policy debate and options development.

Kyoto Mechanisms Table Options Report

1. Introduction

Annex B of the Kyoto Protocol contains the emission targets negotiated for thirty-eight countries listed in Annex I of the Framework Convention on Climate Change.[2] If the Protocol is ratified by 55 percent of Parties to the Convention, incorporating 55 percent of overall Annex B emissions, those industrialized countries would commit to reducing their overall net greenhouse gas emissions during the 2008-2012 time period to a level that is 5.2% below 1990 levels. Canada agreed to cut its net emissions 6% below its 1990 emission level. The U.S. agreed to cut its emissions 7% below 1990, the E.U. 8%, Japan 6% and Russia agreed to stabilize its emissions at 1990 levels. At this time, developing countries have not taken on specified emission reduction commitments. Canada has declared its intention to aim to achieve the majority of its emission reductions domestically. It is nevertheless critical that the Kyoto Mechanisms fulfill their role in assuring that resources dedicated to mitigating climate change are used with maximum impact.

The three Kyoto Mechanisms are :

- "Emissions trading" (ET), [Article 17] that allows industrialized countries ("Annex B" countries) to transfer among themselves portions of their national emission budgets ("parts of assigned amounts" - PAAs) to achieve compliance during the 2008-2012 "commitment period". Some refer to ET as trading in "emission allowances" or in parts of national emission "budgets" ;
- "Joint Implementation" (JI), [Article 6] that allows individual emission reduction or sink enhancement projects in industrialized countries (listed in Annex I) to lead to international transfers of "emission reduction units" (ERUs) ;
- The Clean Development Mechanism (CDM), [Article 12] that allows the issuance of certified emissions credits (CERs) for emission reductions (and potentially sink enhancements) produced by projects undertaken in developing countries (those not listed in Annex I).[3]

The Kyoto Mechanisms allow action to mitigate GHG emissions at lower cost by providing flexibility in the timing, location and method of reductions. Furthermore, the two project-based Mechanisms (Joint Implementation and the Clean Development Mechanism) create opportunities for reducing emissions while contributing to sustainable development in other countries. The JI and CDM Mechanisms are examples of the "open market" approach to emissions markets that allows participants to earn credits for emission reductions made by individual projects. By further opening the range of locations and methods eligible for earning emission credits, these

[2] The Kyoto Protocol makes reference to both Annex I and Annex B countries at numerous points. This report attempts to accurately state the group of countries affected by each individual provision in the Protocol. However, because these two groups of countries are nearly identical, the reader does not lose a large amount of precision by considering the two terms to be interchangeable. A list of Annex B countries from the Kyoto Protocol, as well as their targets, can be found in Appendix A.

[3] For convenience, throughout this document the generic term "emission units" is often used to describe units exchanged under all three forms of the Kyoto Mechanisms – PAAs, ERUs or CERs.

mechanisms provide an important complement to the "cap and trade" allowance-like market system established by emissions trading under Article 17.

The Mechanisms also offer a potentially powerful tool for stimulating new, cleaner technologies and ensuring that potential users in developing countries can access those technologies. However, effective design and implementation of the Mechanisms is critical to the environmental and economic success of the Protocol.

The Kyoto Mechanisms Table was convened to address "International emissions trading and related flexibility Mechanisms such as the Clean Development Mechanism, Joint Implementation and related domestic trading issues". It is important to recognize that the Table's assessment reflects the current thinking given the status of international and domestic developments. Many of the issues addressed in this report will need to be revisited as conditions change.[4]

1.1 Rationale for Flexibility

Because the effort to avert global climate change is advanced when greenhouse gas emissions are lowered or captured by carbon sinks anywhere on the planet, the Protocol allows for *flexibility in location* of emission reductions.

The features of strong environmental protection programs – mandatory reductions in overall emissions, clear rules, strong monitoring, effective enforcement and publicly accessible information – are precisely those needed for emissions trading to fulfill its twin goals of credible emission reductions and lower cost of reaching the Kyoto targets. The Kyoto Protocol provides clear overall emission limits and mandates transparent monitoring and reporting processes. The operational mechanisms are yet to be defined in detail.

Table 1 presents the core elements of effective market-based environmental regulations and identifies the Kyoto Protocol components that provide these elements. The elements of emissions trading systems are also presented.

[4] Appendix B of this report elaborates further on both the international and domestic backgrounds.

Table 1 : Elements of Effective Market-based Environmental Protection Programs, Provisions of the Kyoto Protocol and Market Elements

	Elements of environmental and emissions trading systems	Kyoto Protocol Provisions, Market Elements
Elements needed for effective environmental protection and preservation of emissions market integrity	Overall emission reduction objective	38 industrialized countries agree to cut emissions 5.2% below 1990 during the 2008-2012 period
	Emission targets set for each participant	Targets established for each country. Canada's target : 6% below 1990 U.S. target : 7% below 1990 E.U. target : 8% below 1990
	Emissions monitoring and trade tracking systems	Emission inventories reported annually, trade registries to be public
	Regularly scheduled compliance dates	Countries must show compliance at the end of five-year periods
	Clear legal authority to effectively implement compliance and enforcement system	Methods for detecting and responding to non-compliance now being developed
Elements of market components for emissions trading systems	Definition of measured and tradable units	1 tonne of CO_2, emissions of five other gases (methane, sulfur hexaflouride, perflourocarbons, nitrous oxide, hydroflurocarbons) converted to CO_2 equivalent
	Differences in pollution control costs across emission sources allows gains from trade	Emissions can be cut or sequestered in any sector in numerous countries, including developing countries
	Competitive trading market	Large number of countries and entities can trade
	Efficient and transparent trading	Numerous organized exchanges and other financial institutions plan to offer public trading systems

1.2 Market Mechanics, Linkage With Domestic Implementation

Domestic Emissions Trading (DET) could be used to devolve to legal entities the right to trade emissions along with the responsibility to achieve their part of the national target. However, whether or not DET is employed in the domestic strategy, under international law, when the Protocol enters into force, Parties (national governments) will be ultimately responsible for achieving compliance with their international obligations. Countries that choose to devolve parts of their emission budgets to entities will also need to decide how they assign emission reduction responsibilities and parts of national budgets to entities. They must also determine if and how additional emission credits can be earned domestically (e.g. by sink enhancements and by projects that make emission cuts in sectors that are outside the capped sectors) and must establish emissions monitoring, tracking and enforcement systems.

When entities participate in trading, their acquisition of emission units from a foreign entity or Party increases the amount the acquiring entity is allowed to emit and simultaneously raises the total allowed national emissions of the country in which the entity is located. Conversely, when an entity sells emission units to a foreign buyer, the account balance of both the entity and its Party decline. Transfers among entities within the same country change the account balances of the entities involved, but do not change the Party-level account balance of the country in which the entities are located.

"Party level" trading will dominate where national governments choose not to devolve their emission budgets to individual entities and rely instead on top-down policies to achieve emission reductions, such as carbon taxes, focused technology investments and energy efficiency standards. In these cases the national government would be in the position to execute international trades in order to put the country into compliance or to market unused emission units (if they are not banked).

The following provides a summary of how net emission account balances are influenced by various emission reduction, carbon sequestration (i.e. sink enhancement) and trading activities. A surplus account position is one where the entity or Party holds more emission units then will be required to cover its emissions. A deficit means the participant holds fewer emission units than needed to cover its emissions.

Factors that raise the net emission account surplus or reduce the deficit of a Party or entity :

- reduced domestic emissions
- enhancement of domestic carbon sinks
- acquisition of emission units (a Party's account balance changes only when acquisitions are from other countries)

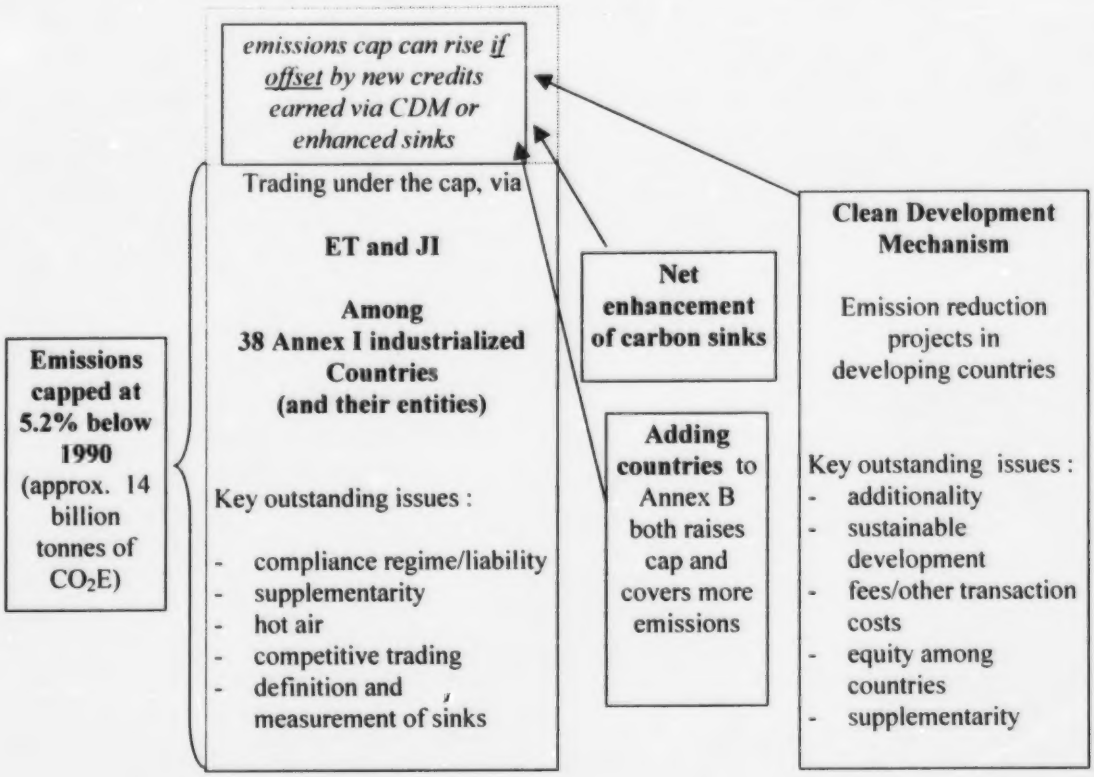
Factors that lower the net emission account surplus or expand the deficit of a Party or entity :

- increased domestic emissions
- contraction of domestic carbon sinks
- sales of emission units (a Party's account balance changes only when sales are to other Parties or entities in other countries)

Changes in these factors can offset one another. For example, if an entity cuts its GHG emissions by 100 tonnes and sells abroad 100 tonnes worth of emission units, neither the entity or its Party experience a change in their net account balances.

Figure 1 provides an overview of the structure of the Kyoto Mechanisms.

Figure 1 : Overall Structure Provided by the Kyoto Mechanisms, Key Issues


emissions cap can rise if offset by new credits earned via CDM or enhanced sinks
Trading under the cap, via
ET and JI
Among 38 Annex I industrialized Countries (and their entities)
Key outstanding issues :
- compliance regime/liability
- supplementarity
- hot air
- competitive trading
- definition and measurement of sinks
Emissions capped at 5.2% below 1990 (approx. 14 billion tonnes of CO_2E)
Net enhancement of carbon sinks
Adding countries to Annex B both raises cap and covers more emissions
Clean Development Mechanism
Emission reduction projects in developing countries
Key outstanding issues :
- additionality
- sustainable development
- fees/other transaction costs
- equity among countries
- supplementarity

2. The Table's Vision for the Kyoto Mechanisms

The Table's vision of the Mechanisms is that they should help Canada and other countries achieve the Protocol's greenhouse gas emission reduction targets, while contributing to sustainable development and reducing economic disruption. The Mechanisms will play a vital long-term role in helping assure a globally efficient use of the valuable resources devoted to preventing climate change. Cost effectiveness will help maintain public support for the ongoing effort that will be needed and thus could help the ratification process. If Canadian businesses participate directly in trading, the Mechanisms should allow them to participate as buyers or sellers in order lower the costs of environmental compliance and the impact on competitiveness and to mitigate impacts on prices and jobs.

Transaction costs should be kept as low as possible, consistent with fulfillment of environmental objectives. To the extent that Canadian businesses directly participate in the market, it is important to emphasize that industry often undertakes very long-term investments domestically and abroad. The ability to make sound investment decisions is aided by providing the maximum possible predictability in the rules established for the Kyoto Mechanisms. The Mechanisms should allow fulfillment of emission reduction obligations in a manner that makes achievement of environmental commitments compatible with the operating routine of Canadian business and industry.

Because the three Mechanisms constitute parts of the new global market for greenhouse gas mitigation, it is desirable that the system works to facilitate free movement among and across the Mechanisms with minimum possible administrative or cost hurdles. If domestic emission trading systems are developed, the Kyoto Mechanisms should allow for smooth interface between the international and domestic emission reduction market systems.

2.1 Specific Vision for Each Mechanism

The Table considered the features of the Mechanisms that would be desirable whether or not entities were directly involved in trading. At the same time, it is widely agreed that trading can be conducted by Parties (national governments) as well as by "legal entities" such as emission sources (e.g. companies and power plants) that may be assigned portions of national emission budgets or allowed to create credits as part of a domestic emissions trading system. The Table views participation in the trading system by individuals, sub-national governments, non-governmental organizations, organized exchanges, brokers, and emissions trading funds to be critical to assuring the effectiveness of the Mechanisms.

Overall Vision :
The Table's vision for all three Mechanisms is that they should provide for an environmentally sound, economically efficient and competitive, administratively simple, transparent and predictable market involving large numbers of participants, that is openly and fairly accessible to all market participants.

Emissions Trading (ET) :
Emissions trading should facilitate the achievement of the overall net emission reduction target for Annex B Parties with the lowest possible negative economic impacts while also avoiding

damage to the competitiveness of businesses in Annex B countries.

Joint Implementation (JI) :
In addition to fulfilling the principles stated in the overall vision, JI should be readily accessible as a vehicle for generating tradable emission reduction units through projects undertaken in all Annex I countries. The Mechanism can be particularly important for creating reductions in countries that do not devolve their assigned amounts to individual emission sources (or other entities) or otherwise do not adopt emission trading programs at the subnational level, and for sectors that are not directly involved in GHG emissions trading programs.

The Clean Development Mechanism (CDM) :
The CDM should both promote emission reduction and/or enhancement of removals by sinks projects in developing countries and contribute to their sustainable development. The CDM should also provide access to certified emission reduction units through a process that has low transaction and administrative costs, and is as simple, consistent and predictable as possible. The system should allow for the maximum possible range of environmentally credible projects that contribute to the Protocol objectives while building and rewarding participation by all countries in the needed global effort to combat climate change.

The paper now addresses various policy and design issues that relate to the environmental effectiveness and market functionality of the Kyoto Mechanisms.

3. Cross-cutting Issues

Several critical issues are cross-cutting and will interact with other issues to define the essential architecture that operationalizes the Kyoto Mechanisms. The private sector will play a critical role in using the Kyoto Mechanisms, and, accordingly, must be engaged in their design and implementation. The fungibility (free interchangeability) of emission units of the three Kyoto Mechanisms is directly related to the liability system that assigns responsibility for excess sales of assigned amounts, and to any rules that might be established to define supplementarity. Similarly, rules governing eligibility to trade and the compliance regime relate directly to each other and to liability rules. Each of these issues are addressed in this section, but it should be emphasized that none of the individual issues can be considered in isolation of the others.

3.1 The Private Sector

As the vast majority of emissions in Canada are from non-government sectors it is the view of the Table that the private sector must be engaged in the design of policies and measures to reduce Canada's emissions, particularly the Kyoto Mechanisms. Table members strongly support the view that the private sector needs to also play a significant role in the development and implementation of the Mechanisms. Strong private sector participation is critical in helping to ensure that :

- use of cost effective opportunities is maximized ;
- the Kyoto Mechanisms operate in an international market that provides for competitive access to opportunities to reduce net emissions ; and
- use of the Mechanisms can be integrated effectively into the operations and procedures of Canadian firms.

Hence, it will be critical to ensure that eligibility criteria developed for the Mechanisms ensure the broadest possible engagement of non-government entities in Joint Implementation, the Clean Development Mechanism and Emissions Trading. It is critical to establish a practical, workable system that encourages private sector participation.

Governments can play a useful role in helping the private sector become engaged in the Mechanisms by identifying and facilitating opportunities overseas and by providing other support for Canadian business, including facilitation of Canadian participation in emissions trading.

3.2 Fungibility Among the Three Kyoto Mechanisms

Fungibility is defined as the degree to which emission units issued or acquired under each Mechanism would be interchangeable. Fungibility would imply that emission units under each of the three Mechanisms would be freely interchangeable regardless of the country, entity or project from which they originated and regardless of identity of the buyers and sellers involved in a transaction. As an example, each one kilogram bar of "995 fineness" gold bullion is equally acceptable as the next, regardless of whether it was purchased from a smelter or received from a vault as delivery on a gold futures contract.

Fungibility is of strategic importance as it would augment the overall commercial viability of all three Mechanisms by facilitating realization of low-cost emission reductions with low transaction costs. Fungibility would also contribute to the formation of a more efficient market and a single global price for greenhouse gas units. Fungibility would facilitate trading by reducing uncertainties as to the ability to use acquired units in demonstrating compliance. In addition, interests of developing countries would be advanced by a regime that allows for unimpeded access to the market for CERs produced under the CDM. Full value for CERs would encourage investment in CDM projects. Thus, assuring that CERs are fungible in the international market could help to build support among developing countries for appropriate decisions on Emissions Trading and Joint Implementation.

At the end of an emission reduction commitment period, emission units are, in effect, "tendered" (retired from the system) in an amount sufficient to offset total emissions of a Party. Tendered units are retired, while any surplus emission units held can be "banked" for use in future commitment periods. Full fungibility would mean that each unit acquired via ET, JI or CDM would be recognized by the Conference of the Parties as equally valid for use by a Party in demonstrating compliance with its national commitment. If all units are equally valid for use by Parties, then each Party could likewise recognize any and all such units if tendered by entities as a means of complying with domestic regulations or commitments.

The issue of fungibility is linked to : liability, supplementarity, the compliance and enforcement regime, transaction costs, carbon sinks, Joint Implementation, Clean Development Mechanism, domestic policy design and additionality.

The Kyoto Protocol provides a clear definition of the traded unit – the denomination is in metric tonnes of CO_2 equivalent. The five other GHGs covered by the Protocol are to be converted to CO_2 equivalent using the Intergovernmental Panel on Climate Change's global warming potential conversion factors.

In the first instance, the Protocol provides for interchangeability (fungibility) among the three forms of emission units. That is, acquisition of Parts of Assigned Amount (PAAs) under international emissions trading, Emission Reduction Units (ERUs) under Joint Implementation, or Certified Emission Reductions (CERs) under the Clean Development Mechanism raise the allowed emission level of the acquiring Party (i.e. acquisitions are added to Party's assigned amount holdings).

However, complete fungibility among the three forms may not be a reality. If the market perceives that some emission units might ultimately be worth less than others, a multi-price bond-like market will emerge as opposed to a market similar to commodity futures where all futures contracts within a vintage (expiration date) are identical. This could occur if :

1. The liability system "devalues" some emission units sold should the selling Party make excess sales (i.e., emissions are greater than assigned amount units held by the seller Party) ; or
2. Supplementarity is defined and results in quantified limits on use of imported emission units (effectively segmenting the market once the limit is hit) ; or
3. Emission units earned by enhancement of carbon sinks are devalued to reflect later release of

emissions from unexpected destruction of the sink.

As the rules governing liability, supplementarity, and carbon sinks are advanced, further work will be needed to fully understand the impacts on fungibility. Because fungibility is a desirable attribute for the Mechanisms, further work should explore methods other than devaluations that can be used to address the environmental integrity concerns that drive the liability and carbon sink issues. The Table also noted that a market structure providing for full fungibility could only be credible if there is consistent reporting of emissions and monitoring of projects under each Mechanism and an effective liability and compliance regime is in place.

3.3 Rules Governing Reporting and Verification, Eligibility to Trade for Annex I Parties, the Compliance and Enforcement Regime, Liability Rules

a) Reporting and Verification Guidelines on the Transfer of Parties' Assigned Amounts :

As required under the Kyoto Protocol, governments are required to report changes in their assigned amount resulting from transactions under the Mechanisms. All such reporting shall also be subject to verification as provided for under Article 8 of the Kyoto Protocol.

Reporting, monitoring and verification guidelines are a critical component in the negotiations on the Mechanisms since they are necessary to demonstrate the environmental integrity of the trading system. Table members did note that this is an important area of convergence between the EU, Umbrella Group members and the G-77 and China.

Table members agreed that comprehensive, credible and transparent reporting, monitoring and verification guidelines need to be developed for the Mechanisms. Having such guidelines in place, implemented equally for all Parties and their entities, would be essential in demonstrating the environmental credibility and competitive robustness of the Mechanisms.

b) Rules Governing Eligibility to Trade for Annex I Parties

Rules governing eligibility to trade by Parties are the rules and guidelines that Parties must meet before they can use the Mechanisms. The provisions governing eligibility to trade, the compliance and enforcement regime and liability rules (as yet undefined) represent three interconnected elements that will form the package used to identify compliance status and respond to cases of non-compliance.

Eligibility to trade is premised first on a Party's ratification and entry into force of the Kyoto Protocol. The issue holds strategic importance because the rules can help maintain the overall credibility of the Mechanisms, and they can influence Canada's ability to participate in trading. The rules can also be an important method for assuring that environmental integrity is not compromised by trading. Uneven application of these rules could also introduce competitiveness issues if they allow economic benefits to remain with Parties that do not fulfill their commitments.

Eligibility to trade relates to the ability to complete the transfers, across registries, for the purpose of receiving official recognition of the trade under the Kyoto Protocol. While eligibility rules do

not restrict the ability for the private sector to continue their ongoing use of forward contracts calling for the exchange of emission units in the future (e.g. after the Kyoto Protocol enters into force and registries are established), the rules would obviously have implications for the desirability of undertaking such transactions.

The two major Annex I negotiating blocks, the Umbrella Group and the EU, agree that Parties are eligible to trade assigned amounts internationally if they comply with Articles 5 and 7 and establish and maintain a national system for tracking holdings and transfers of assigned amounts held by the Party and its legal entities. Article 5 calls for establishment of emission and carbon sink inventories in a manner consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines. Article 7 calls for submission of annual communications of emission and sink inventories as well as information needed to demonstrate compliance with Kyoto commitments.

One implication of these rules is that Canada must develop a registry or registries and continue to compile and report emission inventories if it wishes to be able to trade internationally. The Table feels that rules governing eligibility to trade should provide minimum standards that registries should meet, but should not mandate the establishment of a single, exclusive registry system.

The Table believes that further analysis should examine whether additional conditions beyond compliance with Articles 5 and 7 should govern eligibility to trade internationally. An analysis should also examine whether specific domestic requirements must be fulfilled by entities in order to be eligible to trade and what form those requirements might take, as well as the minimum guidelines for design and operation of registries. The implications of eligibility rules for legal entities is also an important issue that should be further evaluated.

c) The Compliance and Enforcement Regime

The compliance and enforcement regime is the set of methods used to define and determine compliance with the Protocol and to respond to instances of non-compliance. The issue holds major strategic importance to Canada as an effective regime is critical in assuring the Protocol's environmental objectives are met, while helping to assure Canada's major trading partners make comparable environmental protection efforts. It is assumed that if Canada ratifies the Protocol it will act to ensure compliance and that failure to do so by other countries, if not offset by penalties, could lead to an unfair economic advantage. The issue raises difficult questions as to enforcement of international legal instruments, and also has implications for domestic efforts to assess and achieve compliance. The issue is linked to liability, supplementarity and additionality.

Article 18 calls for the Conference of the Parties serving as a Meeting of the Parties (CoP/moP) to approve procedures and Mechanisms to determine and address non-compliance, "...taking into account the cause, type, degree and frequency of non-compliance...". From the Table's perspective, the desired goals of the compliance system are to maintain the environmental integrity of the emissions trading system, to encourage and facilitate compliance with the Protocol, and to provide for early detection and corrective action for cases of possible non-compliance.

Work on compliance encompasses a broad spectrum of interrelated issues, including the development of appropriate rules (*e.g.*, in the fleshing out of the Kyoto Mechanisms), the

development of procedures for assessing compliance, and the development of consequences to non-compliance. Work on compliance issues is at a relatively early stage, with the international joint working group on compliance having met for the first time in June, 1999, in Bonn. Nonetheless, in view of the desire to complete work in time for CoP 6 (fall 2000 or early 2001), at least the broad features of the compliance system are likely to emerge soon. Among other things, international discussions are likely to focus on the question of what consequences of non-compliance the system should include. Two devices that have received some attention are the reduction in assigned amounts in the subsequent commitment period to balance excess emissions in the first period, and a prohibition against sales until "good behaviour"[5] is demonstrated by a Party that has oversold.[6]

The Table recognized that the ongoing work on the compliance regime should remain cognizant that various forms of non-compliance can emerge (e.g. inadvertent data errors, failure to report inventories in a timely manner, gross violations with net emission limits) and that responses should be appropriate to the nature of the violations.

In designing the compliance system, and identifying consequences that might be imposed on non-complying Parties, it will be important to ensure compatibility of approaches under the Kyoto Protocol with international trade law. It is critical to establish a practical, workable system that does not unfairly impact the private sector. As the issue is further elaborated in the international arena during the next year, it will be important to obtain further engagement of various sectors that have a stake in this issue, including civil society and the private sector.

d) Liability for Excessive Sales[7]

The liability question can be defined as follows : Which Party is responsible when sales of emission units are not backed by sufficient emission reductions in the country from which the sales originated? Determining responsibility is a separate issue from imposing consequences for overselling. The Protocol's compliance system will be the process for determining the consequences when an Annex I Party oversells emission units and has a deficit of assigned amounts (net of transfers) compared to its emissions. It is often assumed that a strong compliance and penalty system would reduce the need for a liability system to prevent or deter non-compliance, and vice versa. In particular, while the liability rules of the ET system are thought to offer a vehicle for encouraging compliance, they may not be sufficient to induce compliance. Furthermore, other options must be available to induce compliance by countries that

[5] As is discussed below in section 3.3d, as yet there is no defined standard for determining when a Party is not making sufficient progress toward compliance during a commitment period. It should be kept in mind that one of the main reasons for using five-year commitments periods is to allow timing flexibility in lowering emissions.

[6] Note that suspending the right to sell is, in effect, removal of eligibility to fully participate in trading. There may be implications for entities of these Party-level sanctions although they are not yet fully understood. In addition, it could be difficult to define the "path of compliance" which would be the base to "good" and "bad" behaviours.

[7] Note that while the issue of liability will have broad implications for the functionality of emissions trading within Annex B, by definition, it does not relate to Parties that host CDM projects as they do not have quantified emissions reduction commitments. The liability system could, however, influence the ability for certain Annex B Parties to sell CERs. The reader should also note that Article 6 (JI) provides for a narrow application of buyer liability. It states that acquired emission units cannot be used to meet a buying Party's emission reduction commitments while the Party from which they are acquired is facing unresolved questions regarding its compliance with the inventory preparation and reporting requirements of Articles 5 and 7.

do not participate in ET. Thus, the liability issue cannot be fully resolved until a further articulation of the Protocol's compliance system emerges.

The issue is strategically important because Canada intends to actively use the Kyoto Mechanisms, likely as a net purchaser. It will be important that there be strong assurances that acquired emission units be recognized at full value when used towards meeting Canada's Kyoto target. The liability system may help determine the environmental integrity of the trading system, and, as well, will influence the economic efficiency of the Kyoto Mechanisms through its implications for transaction costs.

Given the nature of international agreements, it is presumed to be difficult to impose on national governments the various penalties commonly used in enforcing domestic environmental regulations. The Table also assumed that any sacrifice in the fungibility of trading instruments resulting from the design of the liability system would raise transaction costs and should be made only if warranted by the need to assure environmental integrity.

Among the many facets of the liability, several considerations should be kept in mind : any liability system should help to maintain the environmental integrity of emissions trading ; the desirability of not burdening all countries with a costly system that may only be needed to address violations by a few ; the trading and emissions data collected annually may or may not give an accurate portrayal of a country's compliance status ; the Party-level system must be workable and low-cost when translated to the entity level ; and the system should be compatible with long-term capital investment and contracting horizons.

Three forms of liability are most widely discussed : seller liability, buyer liability and hybrid systems that combine seller and buyer liability. Seller liability would place responsibility only on the Party that oversold, leaving the buyer free to use the purchased emission units in demonstrating compliance. Regardless of the seller's compliance status, the traded instruments are, in effect, a homogeneous commodity of equal value. As long as the transfer of emission units is recorded in its account, a buyer does not care where the units came from. Many, but not all members of the Umbrella Group have advocated a predominantly seller liability scheme.

Buyer liability would mean that buyers are responsible for a seller's excess sales and could face the risk of devaluation[8] of emission units it purchased if the country from which the units originated fails to make sufficient emission cuts. In this case the responsibility for making the environment whole (i.e. assuring that overall emissions do not exceed overall assigned amounts) falls exclusively on the buyer. If purchased assigned amounts are devalued, the buyer could become non-compliant unless it either makes extra emissions cuts to offset the effects of devaluation or acquires emission units in the market. If a buyer perceives that a country is likely to fail to comply with its net-of-trading emission limit, it would reduce the price it is willing to pay in order to compensate for the devaluation risk. This potential financial loss puts pressure on

[8] *Devaluations* are intentional acts by market regulators, such as a central bank, that alter the rate at which one instrument is exchanged for another. *Discounts* are changes in the relative price of one instrument is exchanged for another that emerge from the collective influence of the buyers and sellers that trade the instrument. The *market* may supersede a market regulator and *discount* one currency (compared to its previous relative price level) if it anticipates that a market regulator will act to *devalue* its currency.

the seller country (from foreign buyers and domestic sellers) to comply. A buyer liability system would introduce a heterogeneous price market akin to the fixed-income market in financial debt (bonds). Buyers would be forced to evaluate the likelihood that a seller's country will comply. Units originating in countries expected to be in compliance would sell at "par" (they would be priced as if they will in fact be recognized as worth one tonne of CO_2), while those sold by countries expected to be out of compliance would sell at a discount to par. A rating process similar to that used to evaluate the riskiness of corporate or sovereign debt might emerge, and insurance products might be offered to protect investors against the risk of devaluation of emission units.

"Hybrid liability", sometimes referred to as the "traffic light" system, would begin as a seller liability system ("green light"), but a "yellow light" flashes if clear signs emerged that a Party is on a path to non-compliance. After that a "buyer beware" setting emerges. Subsequent purchases would be subject to devaluation if the seller ultimately fails to comply. The magnitude of the devaluation may not be known until the degree of the violation is determined. The "red light" would mean further sales are prohibited as a result of strong and/or repeated indications that a selling Party will not comply with its reduction commitments. The emissions and trading information collected under Articles 5, 7 and 8 would be used to assess progress towards compliance.[9] The design and sensitivity of the "trigger" used to decide that a country is overselling is critical. If the switch to buyer liability occurs only in the most egregious cases of failure to show progress, and most countries can in fact show reasonable progress, the market will be closer to a seller liability system.

The Table expressed a preference for the seller liability system as the first option, provided there is a strong compliance regime that effectively addresses cases of excess selling. The Table also recognized that if the compliance system is not sufficiently effective, some sort of hybrid system may be required.

Seller liability offers greater economic efficiency and market flexibility, facilitates early market operation, minimizes transaction costs, and contributes to a unified, more fungible market. These features also contribute to maintenance of competitiveness, and help mitigate impacts on trade balances and regional economies. Transaction costs are lower as there is no need to assess or manage devaluation risk. Seller liability helps keep open a fuller range of offset sources as there is no risk of mistakenly foregoing cost-lowering emissions trades that might be passed up if a buyer wrongly believes that a seller is not complying (e.g. due to a bad credit rating or proximity to a country identified as a "rogue state" due to its documented excess selling).

[9] If international GHG trading involves widespread use of deferred delivery contracts, such as forward, futures and option contracts, then the true compliance status of entities and Parties during a commitment period might not be precisely revealed by comparing emission unit account balances to emission levels. Buyers will be less inclined to use deferred delivery contracts where a seller's creditworthiness and default risk are a problem. High risk of non-performance drives trading to simpler forms, such as immediate cash-versus-delivery spot markets. If those who buy from countries perceived to be high risks of non-performance insist on immediate transfer of assigned amounts into the buyer's account, then the selling activity of risky countries can be accurately monitored on an ongoing basis. The tendency to use immediate transfer contracts will mean that the seller's publicly visible account balances and annually reported emissions data will give a relatively accurate indication of their compliance status.

However, some Table members expressed concern that one enforcement tool that may be used in the seller liability system—next-period reductions in assigned amounts—would not be effective as a sufficient deterrent to overselling. It was noted that this penalty could make it more difficult to achieve agreement to tighten emission limits on all Parties in the future.

Several other proposed liability systems have recently emerged. Most are variations on the "progress check" systems used under the hybrid liability system. It appears that some of the proposed rules could be evaded, and many would cause significant complications and cost if translated into entity-level regulations via domestic emissions trading systems. Further research should examine the effectiveness and functionality of alternative approaches to liability, such as escrow accounts, "sell only as surplus is proven" and insurance systems. Further research should also focus on the impacts of a Party-level liability system on entities that participate in trading and should examine liability provisions used in business contracts.

3.4 Supplementarity

Each of the Kyoto Protocol articles that establish the Kyoto Mechanisms (Articles 6, 12 and 17) contains provisions stating that trading of emission units is not to be the sole method for achieving compliance with net national emission targets, i.e., that trading is to be supplemental to domestic actions. The issue is whether there should be a legally binding quantitative limit on the extent to which Annex I Parties can make use of the Kyoto Mechanism as a method for meeting their Kyoto targets.

The issue holds strategic importance as any actions to formalize restrictions on trading could increase the cost of using the Mechanisms, and may inhibit Canada's ability to access an effective and efficient international emissions market. Canada's intention is to aim to achieve the majority of its emission reductions domestically. However, if supplementarity was made operational through quantified limits on use of the Kyoto Mechanisms, the fundamental principle that Canada should be free to determine its optimal action plan for complying with its commitments would be compromised.

The European Union has proposed a quantified "concrete ceiling" on the use of emission units acquired internationally (i.e., the use of units acquired via ET, JI and CDM). The definition of supplementarity proposed by the EU appears to limit use of emission units purchased internationally to no more than 30% to 40% of Canada's commitment (depending on Canada's emission levels in the near future). The EU proposal did not make clear whether the negotiated internal reallocation of the EU's overall 8% emission cut would be counted when measuring acquisitions or sales.[10] The proposal is not viewed as credible. It appears to imply treatment of transfers within the EU differently than other international transfers, implying an economic advantage for the EU relative to the rest of the world.

Canada and the Umbrella Group (UG) have taken a very clear and strong stand against quantified limits, arguing that the ability to freely trade would encourage ratification of the Protocol,

[10] Internal domestic trading would not be affected by restrictions adopted for the purpose of defining supplementarity.

minimize costs and maintain support for further cuts in the future.

Table members did not reach consensus on the issue. Some Table members felt that limits on trading run counter to the principle of using a market Mechanism to help lower global compliance costs. It was also noted that even if a limit did not ultimately become binding, it could introduce another uncertainty that could discourage investment in overseas emission reduction projects, with potentially negative effects on developing countries. Consistent with the findings of a variety of economic models, the Table expressed concern that compliance costs to Canada could rise if some Canadian entities are forced to undertake domestic emission reductions that cost more than reductions that are available externally.

Applying its criteria, the Table felt that there were environmental arguments in favor of a limit on international acquisitions, while market performance might be negatively impacted by such a limit. Many Table members strongly oppose a cap, arguing that a binding limit would increase transaction costs, reduce flexibility, segment the market into domestic and international prices, cut-off the range of available offsets and reduce fungibility. It would also require establishment of a domestic process for allocating the right to use imported emission units.

Some Table members feel strongly that the environmental effectiveness of the Kyoto Protocol would be advanced by having more emission reductions to be made domestically. This could cause more technological advances to emerge (thus lowering the long-term cost of climate protection) and force more of the overall emissions cuts to occur in better-regulated countries such as Canada. It was noted that environmental co-benefits could be important in Canada, and that doing more at home would improve confidence in the effectiveness of the Protocol. In addition, it is argued that limits on use of the Kyoto Mechanisms could help mitigate the impacts of what could become a "loose" process for granting credits to CDM projects.

A rule forcing more GHG emission cuts to be made in Canada could lead to reductions in multiple pollutants from large industrial plants in areas with acute local air quality problems (e.g., Toronto), but such a rule could just as well lead to other actions with less local environmental benefits. Reduced co-pollutants due to GHG emission cuts at an Alberta oil field or increased carbon sequestration from tree plantings in rural Quebec would however not provide the same local co-benefits.

In the context of the negotiations on the Kyoto Protocol, it was noted that the deal that was struck was contingent on the ability to trade. The Table also raised the question of whether a quantified supplementarity rule would be the best tool for realizing some of the perceived environmental co-benefits noted above.

3.5 Carbon Sinks

The Kyoto Protocol explicitly allows the contribution of certain carbon sinks to be counted in determining compliance with net emission reduction commitments. The issue holds strategic importance because enhancing carbon sinks may be a low-cost, multiple-benefit method for achieving a portion of Canada's net emission reduction commitment.

Article 3.3 of the Kyoto Protocol provides explicit recognition of the removals of greenhouse

gases from the atmosphere by sinks, stating that carbon absorption "... resulting from direct human-induced land-use changes and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks during each commitment period, shall be used to meet the commitment under this Article of each Party included in Annex I."

Article 3.4 provides a basis for determining which and how additional sinks (including "... emissions by sources and removals by sinks in the agricultural soils and the land-use change and forestry categories...") "shall be added to, or subtracted from, the assigned amounts...".

Article 6.1 specifies that JI projects can produce emission reduction units via reductions of emissions by sources or "...enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy...". CDM provisions in Article 12 do not specifically include sinks projects nor are sinks excluded. Canada's formal submission to the UN-FCCC on Articles 3.3 and 3.4 states that "Under the Clean Development Mechanism (Article 12) where accounting is based on specific projects, rather than national totals, there is no specific restriction on the type of activity that can be included. Instead, the only requirement is that projects be certified to provide benefits that are additional to what would have otherwise occurred". The Umbrella Group (including Canada) has submitted a joint non-paper on the CDM to the UN-FCCC (March 1999) stating that both emission reductions and removals projects should be eligible for credit under the CDM. The IPCC is preparing a special report on sinks to be released in May 2000. This report may affect Canada's position.

The environmental community has expressed concerns over the ability to accurately measure the effectiveness of carbon sinks, the permanence of carbon storage, and the overall environmental integrity of including sinks, especially in the context of the CDM.

Canada's policy position is that sinks projects should be eligible for both JI and CDM credits under the widest scope and broadest definition. Given that this is not a consensus interpretation internationally, Canada must clearly and consistently articulate its position and promote its position both unilaterally, and with support of allies, on a dual track through the IPCC process. It is anticipated that domestic systems for monitoring carbon stock changes will need to be established in a manner that conforms to international standards. This may involve remote sensing systems, land surveys and other methodologies that could be advanced through coordination with related federal and provincial forestry and agricultural agencies as well as industry associations and universities.

4. Other Issues Identified by the Table

4.1 "Hot Air"

The surplus gap between projected GHG emissions during the 2008-2012 time window and the assigned amounts for Russia and other economies in transition (e.g., Ukraine) is often referred to as "hot air". The question is whether actions should be taken to limit countries' ability to sell, on the emissions trading market, surpluses that arise from emission targets that are "soft", largely due to economic recession.

The issue is strategically important for Canada because of environmental concerns that the Kyoto targets could be met, in part, by purchasing these "paper credits". There is also a concern that allowing sales of such surpluses sets precedent for developing countries to take on "loose" targets so they can gain by selling such "tropical hot air". This debate amounts to a discussion over changing targets of the Kyoto Protocol that were arrived at through difficult negotiations. While the Table recognizes the matter is an issue in the international dialogue, it is concerned that it is not important enough to justify lengthy debate that detracts from other critical issues.

Many environmental groups and some countries argue that these projected surpluses should be reduced in size or kept out of the market as they represent "free" emission cuts (and revenues, if sold) arising from severe economic contraction, not proactive policies. The macroeconomic benefits of having a new source of revenues to help offset the impacts of economic recession are not often recognized. In addition, many feel that "hot air", however defined, was part of the bargain truck in Kyoto.

The Table agreed that the negotiations on the emission reduction targets agreed at Kyoto should not be reopened. It was also recognized that restricting sales of "hot air" could allow for future negotiations to close this perceived Kyoto "loophole".

In terms of the KM Table criteria, restraints on sales of "hot air" would imply higher overall prices for emission units (higher compliance costs). Regarding environmental effectiveness, unrestricted sales of "hot air" will imply higher overall emissions in the near-term, compared to a situation where owners of "hot air" banked those units for future use.

Direct responses that have been considered for addressing the issue include renegotiation of the assigned amounts, prohibiting or limiting sales (as called for in the EU proposal on supplementarity), or requiring that sales proceeds be dedicated to preferred activities such as further greenhouse gas cuts or other environmental programs. Other proposed responses are largely indirect, such as mandating transparency in large trades by Parties.

Representatives of Russia have publicly indicated they are willing to dedicate proceeds from sales of emission units to either additional reductions in GHG emissions or other environmental protection projects. This approach would be consistent in principle with the proposal recently forwarded by Switzerland. The Table feels that ideas along these lines should be encouraged, but that the issue should not be a major focus for Canada.

The Table identified two forms of precedent associated with the issue. Countries considering

accepting emission targets might negotiate high emission targets in order to realize revenues through sales of "hot air". Conversely, the Table also noted that it might be desirable to be able to offer an incentive, in the form of a short-term emission account surplus, to encourage countries to accept quantified emission commitments. The emphasis under this approach is to first get a country to join the group of countries that accept limits and to later focus on tighter limits for all countries. The Table agreed that further analysis should explore how developing countries should be encouraged to accept commitments that are not too "soft".

The other precedent is the *de facto* reopening of negotiated commitments because of changes in a country's economic or technical circumstances. Some Table members noted that Canada would not necessarily be immune to revisions of this sort.

4.2 Competitive Access to the Kyoto Mechanisms

Competitive access is defined as the ability for all market participants to have fair and unimpeded access to the markets created by the Kyoto Mechanisms. The issue is strategically important due to the possibility that national governments or large entities (or groups of entities) might exercise non-market influence in order to obtain preferred access or transaction terms for large transfers of emission units. Such uncompetitive activity would interfere with the ability of Canada's private sector to fully utilize the Kyoto Mechanisms to reduce compliance costs. The issue interacts with many others that will frame the overall functioning of the market system, and is one of numerous elements associated with the international trade and competitiveness dimensions of the Kyoto Protocol.

The EU has proposed that trades (large sales in particular) conducted by Parties (governments) be subject to open, competitive bidding or prior public notice. The overriding goal is to provide transparency for efforts by Parties to conduct large trades. Publicizing planned trades in "hot air" would give the international community the opportunity to voice their concerns over such trades. In addition, some Parties are concerned that large trades would be conducted by Parties on non-competitive terms, and the chance to have time to offer a competing bid would reduce the opportunity for exclusive domination of the market.

The Table recognized that the focus of this emerging issue (for which there has been only one formal proposal) appears to be on the trading practices of Parties, not legal entities. In analyzing the issue, the Table assumed that it would be desirable that transactions not be driven by non-market considerations such as political influence. The Table noted that it is important to have a public price discovery process, but did not feel that the EU proposal was necessarily a desirable Mechanism for addressing the issue. The Table also took into account the historical tendency for some countries, particularly Europeans, to subsidize access to markets for domestic entities.

The Table noted that prior notice of planned trades (for public dissemination) or mandated public auctions, if required only for large trades by governments, might help to contribute to price discovery, competition, and market efficiency and could enhance access across geographic locations and offset-types.

The Table also observed that mandating the prior announcement of trades, depending on the nature of information made public, could harm the interests of Canada and Canadian industrial

and financial firms. They could be harmed by a process that publicizes privately negotiated trade terms and other commercially sensitive information and or interferes with their ability to complete trades that may take considerable resources to prepare.

The Table recognized that the lack of detailed proposals for operationalizing the EU proposal makes it difficult to fully understand its implications. It is unclear how much trading activity might fit within the category of trades targeted by the proposal. In addition, the Table recognized that Parties at which these mandates are targeted may be able to work around them by devolving emission units to agencies or artificial companies or conducting smaller, more frequent trades.

The Table agreed that the full ramifications of this issue have not been fully assessed. The Table also asked if the proposed rules are the best tool for realizing the intended objectives. Some Table members felt that it might be desirable for such a rule to apply to all trades, not just large government trades. It was suggested that it would be useful to examine the experience with any similar rules used in the capital and commodity markets. The Table felt that the issue could not be fully appreciated until questions of what information would be released, when notification would occur, what is defined as a "large" trade, and how the rule would be policed, are answered.

4.3 Institutions

The Kyoto Protocol establishes several new institutions while keeping numerous responsibilities with the Conference of the Parties. The responsibilities of the UN-FCCC and its subsidiary bodies on implementation and technical advice have also been expanded. However, many of the processes needed to make the Kyoto Mechanisms operational can be provided by existing private and public institutions, which would be less costly and time consuming than building new bureaucracies.

As noted above, registries for tracking emission unit holdings and transfers, rules for monitoring emissions and carbon sinks, and legal Mechanisms for enforcing these rules are needed to allow full integration into the international trading system.

While some of the necessary systems are new, many if not all of these functions can be fulfilled by existing private and public sector institutions. Accounting and certification firms can fulfill the role of "operational entities" as required for the CDM. Coordination processes used by organized exchanges worldwide also provide a useful market model. Market facilitators, including brokers, bulletin boards and organized exchanges will aid the price discovery and trading process. Market information will arise from the annual reports of holdings and transfers called for in Article 8 of the Protocol. Many argue that a competitive, accessible trading market is likely to emerge, given the likelihood of a large number of participants and mandated system transparency. Several countries are developing domestic trading systems that would involve large numbers of traders. As in the U.S. SO2 allowance market, small scale auctions can help assure accessibility and generate public prices.

5. Issues Related to the "Project Based" Mechanisms : CDM and JI

Working Group 2 of the Kyoto Mechanisms Table commissioned papers examining Project Eligibility, the Transaction Process, Project "Accountability" and Market Intelligence. Thinking on needed institutions was also developed.

The project-based Kyoto Mechanisms are of critical strategic importance as they can allow Canada to apply clean technologies, support sustainable development, generate local environmental benefits and help meet its emission reduction commitments at lower cost. It is important to focus on the design of the project-based Mechanisms as they represent relatively new instruments. The JI and CDM Mechanisms are an example of the "open market" approach to emissions markets that allows participants to earn credits for emission reductions made by individual projects. By further opening the range of locations and methods eligible for earning emission credits, these mechanisms provide an important complement to the "cap and trade" allowance-like market system established by emissions trading under Article 17.

In order to assess the key issues surrounding the design of the CDM and JI systems, it is useful to consider the steps involved in implementing projects. Not all participants in all transactions will face all these steps as some trades will involve acquisition of emission units from projects after a project has completed the implementation and certification processes.[11] In addition, it should be noted that the process for JI will differ from that for CDM as the Kyoto Protocol prescribes that emission reductions by CDM projects must be certified by "operational entities".

5.1 Transaction Process

The key questions concern the overall process for implementing project-based emission reduction and sink enhancement activities under the JI and CDM systems. The issue is strategically important because the systems, including the institutions responsible for registering and certifying projects, will have a large impact on the attractiveness of the Mechanisms. This implies a direct bearing on overall transaction costs for using the Mechanisms. There are a number of organizational and operational factors that may lead to higher transaction costs for CDM projects than for JI projects. Secondly, some Parties believe that guidelines for establishing project "additionality" under JI would be less onerous than CDM since JI projects will not change overall allowed emissions from Annex I countries.

At this time it is unclear whether the CoP, or the CDM Executive Board will establish criteria defining eligible projects or whether approval by involved Parties will be sufficient to render a project "eligible". Nevertheless, before it dedicates significant resources, a project developer will need to assess whether the project they are considering will be ultimately make it through the process and yield emission units. Project approvals will be required by involved Parties (i.e. host and investor country governments) based on criteria set by some combination of the Conference of the Parties, host countries, and the CDM Executive Board.

---

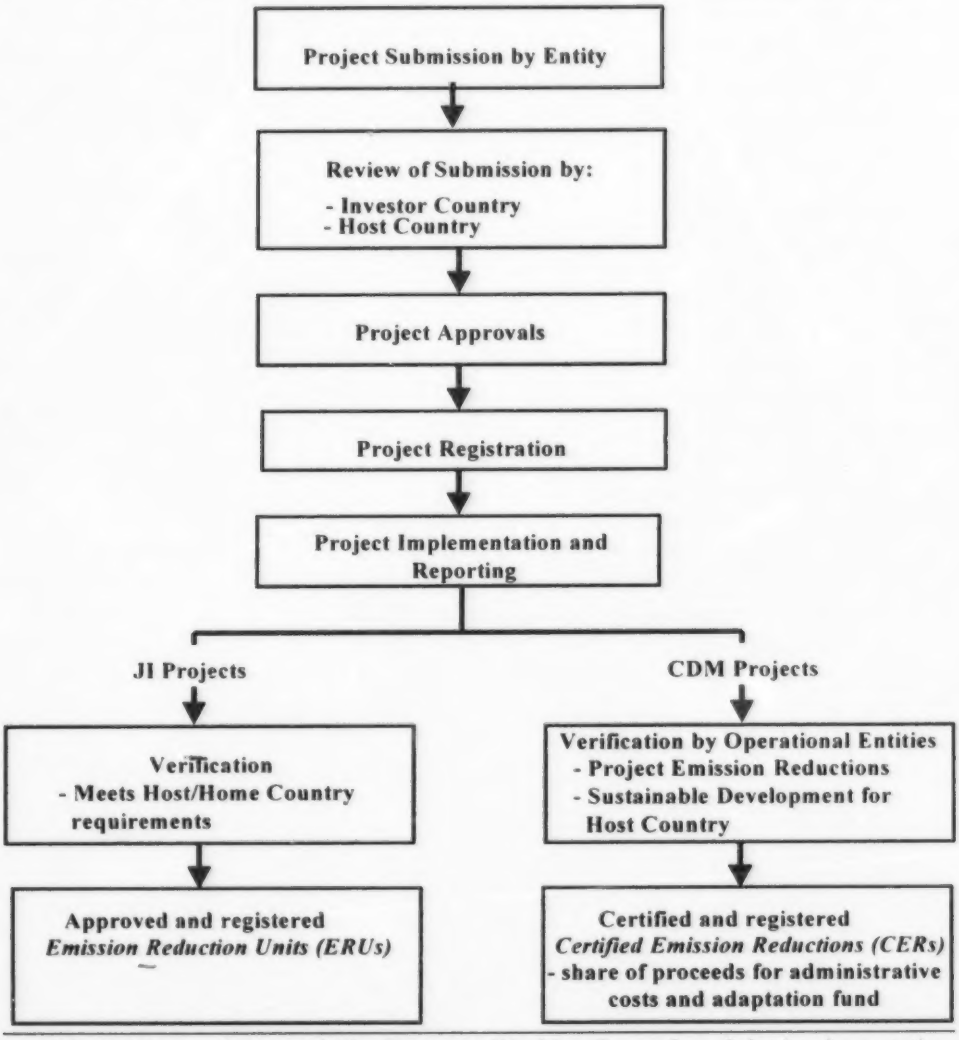
[11] The major categories of transactions that may emerge are : **bilateral** trades where a buyer contracts to acquire CERs or ERUs to be produced in the future ; sales arising from **unilateral** implementation of projects by host country governments or legal entities ; sales by **multilateral** agencies, groups of countries ; sales by private "fund" operators ; **within-company** projects undertaken by a multinational company at an overseas facility.

Figure 2 summarizes the steps involved in the CDM and JI project implementation. The exact order of the steps is not yet clear. For example, the Table recognized that there may not be an investor involved with a project at an early stage if the project is initiated unilaterally by a host country government or entity. Value exchanged between investors and project proponents can occur, before, during and after implementation of the project. The emission reduction effectiveness of a project may have to be documented by ongoing monitoring. In the case of the CDM, a "portion of proceeds" from CDM projects will be used to cover CDM administrative costs and to help establish a fund for assisting in adaptation for those developing countries most vulnerable to climate change.

The path for JI projects is somewhat different from CDM. Under JI host countries will determine the methods to be used in defining emission reductions. In addition, for JI there is no interaction with the CDM Executive Board (for project approvals, registration or reporting), and, unlike the case of the CDM, the Protocol does not mandate that the specific rules be developed for the JI system (it does say that the CoP/moP may further elaborate guidelines). This may reflect the fact that any emission reduction units granted to a JI project do not increase the overall level of industrialized country allowed emissions (i.e. as with ET, JI is emission-neutral on a global basis). The final step subsequent to the generation and registration of ERUs and CERs will be (at some time) the transfer of these units to Annex I Parties or entities for use in demonstrating compliance with emission reduction commitments.

The Table considered the Protocol's provision that "Parties not included in Annex I will benefit from project activities resulting in certified emission reductions". Some discussions have called for developing countries to receive a portion of the certified emission reductions produced by a project, while others argue that the existence of the project in its own right provides benefit for the host country. Similarly, some argue that the terms of each project should be negotiated by those who are directly involved.

Figure 2 : Elements of the CDM and JI Project Implementation Process[12]



Adapted from : Accountability Report to Working Group 2 on Joint Implementation and Clean Development Mechanism, Kyoto Mechanisms Table, IISD Business Trust, May 17, 1999.

The Table also considered the question of whether developing countries should be allowed to directly participate in trading without having an investor country Party or entity involved. One line of thought is that developing country governments and entities are closest to the situation

[12] The details associated with the first five elements presented in Figure 2 could be significantly different under JI and CDM due to different processes involved in project approval, registration and reporting and differing standards for additionality and sustainable development that may apply.

and are well-positioned to identify and implement good projects. In addition, some question whether a rule requiring participation of an investor could be enforced. On the other hand, some feel that developing countries might tend to claim credits for projects that would have happened "anyway", and that allowing unilateral projects might reduce the prospects for expanding the group of countries that ultimately accept emission limits.

5.2 Project Approval/Sustainable Development

As noted above, both the JI and CDM systems require acceptance of both host and buyer countries.[13] At this time it is unclear which third party (e.g. the Conference of the Parties, the CDM Executive Board), if any, will be given responsibility to deem certain types of CDM ineligible for crediting. The Table considered the ramifications of establishing an official list of "pre-approved" project categories. The Table feels that such a list could conceivably be a source of useful guidance. However, it would reflect a politically negotiated process that could, if it acted to exclude unlisted project types, preclude innovative projects and harm Canada's strategic interests. In addition, the Table recognized that establishing such a list would involve time-consuming negotiations.

Article 12.2 of the Protocol states that "The purpose of the Clean Development Mechanism shall be to assist Parties not included in Annex I in achieving sustainable development..." while also noting the use of credits from CDM projects in achieving compliance by Annex I Parties. The Table discussed a variety of ways for operationalizing the sustainable development standard. The Table recognized that if this criterion was applied solely by host countries there would be a risk that certain projects would be advanced that are inconsistent with broadly accepted notions of sustainability. This outcome could cause distrust of the entire Mechanism and might cause a backlash against those involved.

The Table recognized that it is the right of developing countries to set criteria defining sustainable development. It also noted that Canadian industries can share their knowledge base on sustainable development issues. Many Canadian private sector investors have corporate sustainable development policies, procedures or investment criteria in place and these could form a basis to build upon when considering international investments in emission reduction projects. It was recommended that an industry-ENGOs-government dialogue on this be established for the purpose of exploring the idea of voluntary guidelines that Canadian entities might take into consideration when investing in CDM and JI projects.

Article 12.4 establishes that the CDM "shall be subject to the authority and guidance of the Conference of the Parties ... and be supervised by an executive board of the Clean Development Mechanism". The Table recognized that the CDM executive board would be a more efficient decision-making Mechanism than the Conference of the Parties. It also observed that a smaller executive board would be more efficient than a larger one, but expressed concern that a smaller board may make it more difficult to assure that Canada's interests are reflected.

[13] Note that there will not be an identifiable "buyer" country at the time a unilaterally implemented project is initiated.

5.3 Quantifying Emission Reductions : Additionality and Baselines

a) Additionality

Both CDM and JI projects must achieve emission reductions that are additional to those that would otherwise occur. The issue is especially important for the CDM since credits earned from those projects increase the global level of assigned amounts (i.e., allowed emissions), whereas JI credits reduce the assigned amount of the transferor in an amount equal to the increase in assigned amount of the acquirer. Additionality provisions for the CDM call for certification of emission reductions that are "... additional to any that would occur in the absence of the certified project activity" (Article 12.5c).

The issue holds strategic importance because the criteria used to make additionality operational might be so onerous and demanding that use of the Mechanisms becomes cost prohibitive. At the same time, it is important to maintain the environmental integrity of the project-based Mechanisms.

The Protocol does not mandate that rules defining "additionality" be established for JI[14], while Article 12 specifies that "modalities and procedures" shall be elaborated for the CDM. If credits arising from a CDM project exceed the real amount of emission reductions the project produces, the purchase and use of such credits causes a net increase in global emissions. Thus, achievement of the environmental goals of the Protocol calls for accurate quantification of reductions under the CDM.

Emission reductions are "additional" if a project causes actual emissions to be less than they otherwise would have been. "Additional" emission cuts are calculated as the difference between "without project" emission levels (the emissions baseline) and "with project" emission levels. Determining an emissions baseline involves projecting what would have happened in the future in the absence of the project, which can require an assessment of a wide range of legal, economic and technical factors. Emission baselines can be formulated by referencing current or historic emission patterns, or by projecting future regulations and the state and penetration of future technologies. For example, the Table felt that projects that install technologies that were already required by regulations would generally not represent something "additional", but such technologies might in fact deserve to be considered additional if those regulations are not effectively enforced. The Table also noted that what may be a new, "additional" technology at one date may later become routine and perhaps should not deserve to be credited once it becomes routine. On the other hand, some Table members argued that the imposition of too many additionality criteria would cause fewer projects to go forward. The notion of starting simple and learning by doing was cited as one way to gain experience with this challenging question. This would address the concern that it is impossible to accurately discern the true motives that lead to the implementation of a project.

[14] There are already strong incentives to properly measure the emission reductions produced by a JI project. Host country governments will want to be sure that parts of assigned amounts granted to and exported by a JI project do not exceed the extent to which the project lowers national emissions as measured under the Protocol. In addition, investors will want to receive a quantity of ERUs corresponding to the emission reduction effectiveness of the project in which they invest.

The Table recognizes that there are always many motives which lead to the development and implementation of projects. It will be time consuming, costly and very likely impossible to determine exactly what would have happened anyway and this condition should not be allowed to become a barrier to implementation of JI and CDM projects.

The Table considered a variety of forms of additionality[15]. Industry and other Table members strongly prefer that the focus for CDM projects should be on environmental additionality compared to "business as usual". Environmental groups feel that other additionality criteria should be applied. The Working Group also felt that local considerations should be weighed in the determination of additionality for particular projects. In addition, the Table feels that the greenhouse gas implications of a project should not be the sole focus. Other factors, such as the compatibility of a project with local conditions and capabilities, and local environmental benefits should also be taken into consideration.

Table members discussed the desirability of assessing the comprehensive emission implications of a project. However, the Table also recognized that an assessment of the emission impacts of all related aspects of a project (e.g., the emissions associated with producing the solar panels installed in a CDM project) would be a costly and potentially impossible standard to meet.

Given the importance of the project-based Mechanisms, the Table feels that Canada should take a leading position in generating and sharing knowledge about these Mechanisms. This could take the form of workshops and other educational activities for disseminating lessons from project-based emission reduction activities and proposing concrete definitions based on practical examples.

b) Emission Baselines

An emission baseline is the hypothetical "without project" emission level that is used to calculate the magnitude (i.e. number of tonnes of CO2) of emission reductions that a project produces. For example, if a factory would have emitted 5,000 tonnes of CO2 per year in the absence of the project (the baseline), and installation of new equipment lowers emissions to 1,000 tonnes per year, the project is deemed to have produced 4,000 tonnes of emission reductions per year.

The issue holds strategic importance because baselines are a critical element of the project-based Mechanisms. Baselines can be calculated in a variety of ways, and the Table weighed the following factors in considering the issue : environmental integrity ; the desirability of low transaction costs ; the availability of data and technical information ; overall practicality of

[15] In addition to emissions additionality, the Table considered : *programmatic additionality*, which considers motives and asks whether the project would not have proceeded absent a greenhouse benefit or whether its implementation required overcoming any significant barriers ; *financial additionality*, which would require that a project proceed without official development assistance, or, alternatively, that the project not be reasonably profitable (because in that case it "should have occurred anyway") ; *temporal additionality* indicative of the project being implemented sooner than it otherwise would have been absent the benefits of a greenhouse gas credit ; and *technological additionality*, which would require that credits be granted only if a project employs technologies that are superior (in terms of GHG emissions) to those ordinarily being installed in a country or region at the time a project proceeds.

different approaches.

Many potential design options exist for determining emission baselines. It is widely believed that higher accuracy in determining "business-as-usual" emission levels comes at the cost of reduced practicality and higher cost to project proponents. The Table considered four methods for specifying emission baselines.

- ***Project-by-Project Baselines*** – sometimes called a "bottom-up" approach, this approach estimates the actual change in emissions that result from each individual project by comparing emissions to a narrowly-defined, project-specific without-project emissions baseline.

Standardized reference emission rates, sometimes called a "top-down" approach to baselines, are considered less costly to use. The proposed methods for establishing these include :

- ***Sectoral Baselines*** – or *common baselines for a sector or sub-sector*, for example, the emission levels occurring in a broadly defined industrial sector (e.g. the national average of CO_2 emissions per megawatt hour of electricity produced) against which all proposed projects are evaluated.

- ***Matrix-based Baselines*** – which reflect the emission rates of the *mix of technologies* currently in use in the host country, rather than absolute emissions or sector-wide emissions intensity. The matrix is used to identify and rank best available technologies and practices that would provide the basis for baseline emission rates.

- ***Benchmarks*** – or uniform *performance standards*, such as a rate of emissions per unit of output, operation, or time, which could be based on emission rates of facilities in industrialized countries.

Project-by-project baselines are sometimes viewed as more accurate than the other alternatives considered. They are case-specific and do not suffer from the effects of using broad averages employed in the other methods. However, the Table recognized that even a project-specific approach would not necessarily provide an accurate baseline in all conditions. The Table believes that project-specific baselines often require extensive resources to develop. If done in a comprehensive way, predicting what would have happened without the project requires a project proponent to predict the state and availability of new technologies, government regulations, energy prices and macroeconomic conditions. The costly and arbitrary nature of this process would escalate under the CDM as an operating entity (such as an accounting or certification firm) would be required to either concur with the project proponent or form its own case-by-case baseline. The experience with the pilot phase of AIJ proved that this process is costly and difficult, and can become nearly impossible to do properly when developing countries do not have adequate data needed to form a baseline.

Reference case emission baselines are thought to be less costly to apply, once the higher up-front cost for establishing them has been incurred. Conversely, many feel that reference emission give a less accurate depiction of "without project" emission levels compared to project-specific

baselines. Sectoral baselines provide a common reference emission rate for calculating the emission reduction impacts of all projects within a sector (e.g., electric power generation). On the other hand, establishing sectoral baselines for each country may involve data and modeling skills that are not available in many countries. The matrix-based approach offers a consistent approach for ranking the relative attractiveness of the technology adopted in a project, based on the state of technology specific to each country or region. The disadvantages of this approach include the difficulty of defining the breadth of technologies that each project should be compared to – should a local, national, regional or global standard be the reference case? Benchmarks offer a consistent, easily used standard emission rate. Their downside is not only high up-front costs of establishing them for each country or region, but they may also cause more errors by granting credits (or failing to grant credits) to projects that, if examined individually, would deserve a baseline that differs from the common reference that the benchmark provides.

Additional factors to be considered in establishing project baselines include :

- *Geographic scope* (i.e., national or regional)
- *Temporal scope* (i.e., historical or forward-looking) ; and
- *Stability and duration of the baseline* (i.e., Should the baseline should remain fixed over time or be subject to change? When?).

Many Table members cited investor's need for certainty in predicting the benefits from a project and called for long-term stability of baselines. It was noted however, that as technology improves, it may be appropriate to occasionally strengthen the emission standards that long-lived capital must exceed in order to continue earning credits.

The design options discussed above enjoy varying levels of support by Parties to the Protocol. Developing countries have strongly opposed both sectoral baselines and benchmarks, as they see them as the first step towards emission reduction commitments. At the same time, many Annex B Parties are concerned that sole reliance on a project-by-project approach could unnecessarily raise transaction costs.

The Table is of the view that no single methodology for calculating baselines is appropriate for all projects in all counties. It recommends a flexible approach, which will enable investors and host countries alike to use baseline methodologies most appropriate to a project's local and national circumstances. The Table also recommends exploring the use of different methodologies, including regional baselines, or piloting the use of different baseline methodologies as part of a "learning by doing" approach to the Mechanisms.

Regardless of the methodology used, Parties and investors must ensure that emission credits are consistent and reputable within the international framework for the Mechanisms. The Table felt that uniform international guidelines should be developed for baseline definition for CDM, which could then be interpreted at the national level. Potential models or templates for this approach could include the ISO 14000 process, or options developed by experts from international organizations, such as the Intergovernmental Panel on Climate Change (IPCC).

5.4 Project Accountability

Project accountability can be defined as the process for documenting and tracking a project and verifying its environmental effectiveness. The issue is strategically important because accountability is a key component of the overall transaction process, particularly for the CDM. Articles 6 and 12 contain a number of provisions aimed at ensuring transparency, efficiency and accountability in the design and operation of both Mechanisms.

The Table feels that both the development of a standardized reporting format, as well as the establishment of an electronic registry, would be useful for both the CDM and JI. In addition, the Table agreed that the requirement to have "operational entities" (as designated by the CDM Executive Board) register, verify and certify emission reductions should be carried out through a system of local accredited organizations, similar to the ISO 14000 model16. These entities could be accredited, and their performance assessed, using methods similar to those employed by the Canadian Institute of Chartered Accountants.

In addition to documenting the emission reduction performance of a project, the Table felt that the accountability process can be an effective Mechanism for reporting on a project's contribution to sustainable development.

A Canadian system for establishing and communicating "approval" of JI projects in conformance with Article 6.1a and "voluntary participation" of CDM projects in accordance with Article 12.5a is needed. Similar procedural Mechanisms are needed in host countries that wish to allow for JI and CDM projects. As noted in the section on sustainable development requirements for CDM, this approval Mechanism could be the vehicle for articulating the Canadian view as to the nature of projects that meet qualitative sustainable development standards. It may be most logical for these functions to be carried out by the existing Canadian CDM/JI Office.

5.5 Transaction Costs and Risks

The Table recognized that transaction costs have the potential to stifle usage of the Kyoto Mechanisms, especially the CDM. While it is recognized that the system must have clear, environmentally effective rules, the experience in the Activities Implemented Jointly pilot phase showed that transaction costs can impede projects. The process for determining baselines and additionality, and obtaining project approval (at both host country and CDM system levels) imposes costs that may reduce the usage of the project-based Mechanisms if the requirements are onerous. If not counterbalanced by very low emission reduction costs, high transaction costs and risks put CDM on an unequal footing relative to ET and JI. However, the Table recognizes that while lower transaction costs are desirable, it is also critical to maintain environmental integrity of the project-based Mechanisms. Simpler rules for determining baselines and additionality would help address the cost issue. Similarly, streamlined processes for approving projects would give a clearer picture to all participants as to the likelihood that a project can successfully

[16] Project verification refers to the procedure by which CDM projects are evaluated on the basis of whether or not they have delivered emission reductions. Article 12 also requires CDM-related emission reductions to be certified, on the basis of voluntary participation by Parties, the production of real, measurable, and long-term benefits, and additionality.

navigate the approval processes at low-cost and with reasonable speed.

5.6 CDM Fees

The Table considered a variety of means for raising funds to cover CDM administrative costs and to fund adaptation assistance to developing countries particularly vulnerable to climate change, as called for in Article 12.17 Other than expressing a desire to minimize overall costs of using the CDM, the Table did not settle on a preferred magnitude for this levy. The Table noted that high fee levels could impede use of the CDM and thus result in minimal funds for administration and adaptation. It was also recognized that CDM fees should not the sole financial source to raise the adaptation fund.

Four specific approaches for enacting the levy were considered :

1. Percentage of gains from trade
2. Percentage of sales price
3. Flat per-tonne fee levied upon issuance or first transfer
4. A portion of earned CERs.

Among these four options the Table preferred option 4. It is administratively feasible, it avoids levying charges before revenues are realized from sales, and can help contribute to public price discovery (through subsequent sale or auction of CERs). However, the Table feels that further work should examine other possible funding methods. In particular, the Table feels more work must be done to address the level and optimum method for funding administrative costs. None of the options considered address the issue of near-term financing of administrative costs. The Table is also concerned that the CDM system not be the only source of funding for supporting adaptation assistance.

Risks associated with investments in JI and CDM projects include, among others, the risk of not receiving project approval from the host or buyer country, the risks of the project not delivering results, and the risk that the rules of the game change during the lifetime of the project. The issue to address is how to design the rules of CDM and JI so as to reduce these risks and what role national governments might play in underwriting the risks.

Commercial and contractual methods for managing or avoiding these risks are likely to include : shifting the risk of project under-performance or rule changes to others by restricting purchases to already-approved CERs/ERUs ; structuring contracts for payment only on final delivery ; purchasing from pools that sell guaranteed credits, buying insurance to cover non-performance ; or purchasing credits from projects that are backed by third-party guarantees (e.g., by the World Bank). Risks can also be borne by buyers, who might also adjust their commercial strategy through discounting the prices they bid for future credits (credits that are not yet certified or issued) to reflect project or regulatory (rule change) risk. Diversifying risk by assembling a portfolio of credits with a mixture of discounted investments and guaranteed investments is another option.

[17] Consistent with the provisions of the Kyoto Protocol, the Table feels that fees should apply only to the CDM.

The impacts of regulatory requirements, uncertainties and fees involved with the CDM, when combined with the well-known costs and risks of doing business in developing countries, may significantly reduce the economic attractiveness of CDM projects. If the CDM has only limited success, the desirable goals of spreading clean technologies and boosting developing country participation in the needed global solution would not be realized. The overall result would be higher compliance costs and lower developing country participation. For these reasons all possible efforts should be to simplify the system wherever possible and to provide stable, predictable rules. If this does not occur in the UN-FCCC, domestic policies can be established that would help achieve the same goals – ease of use, access to low-cost offsets, spread of clean technologies and growing participation by developing countries in the global effort. Proactive government policies can take the form of sharing best technical and transacting practices, and generally helping host countries establish an enabling environment that helps projects move forward. Canada is in a position to help develop such an environment in several countries with which it maintains positive relations.

6. Linkages to Domestic Process

6.1 General Linkages

In order to discuss the elements needed to fully integrate Canada into the international emissions trading system, the Table considered scenarios with and without the adoption of a domestic Canadian emissions trading (DET) system. The Table recognizes that a domestic trading system would employ many of the emissions monitoring protocols, emission unit tracking systems, reporting requirements and other legal provisions that are needed to provide effective integration into the international system and to conform with the eligibility conditions for participating in international trading.

The development of the Kyoto Mechanisms, including their linkages to domestic processes, raises significant public interest and private sector issues. In order to address key principles espoused to date in the discussions of these issues, including cost effectiveness, environmental integrity and credibility, and transparency, it will be necessary to ensure that there is opportunity for the various interests to comment on and participate in the development of these Mechanisms in the Canadian context. Thus, alongside governments, other stakeholders including the private sector and public interest organizations should have appropriate opportunity to participate in policy debate and options development.

a) Preparing for Use of the Mechanisms

Many Table members feel that a domestic system that provides credit for early action to reduce greenhouse gas emissions would be a key step in assuring successful uptake of the Kyoto Mechanisms by the private sector. The Table recognized that a Canadian program that gives credit for early and verifiable actions to reduce or capture greenhouse gas emissions would stimulate trading domestically and could be an effective method for gaining the experience needed to effectively use the international Mechanisms. Table members recommended maintaining an explicit link with the work being done by the Credit for Early Action Table and by the Tradeable Permits Working Group.

A variety of preparatory steps can be taken to help build capacity among legal entities and government agencies. However, usage of the Mechanisms is unlikely to be widespread until a clearer picture of the likely domestic regulatory situation emerges.

Aside from entering into forward contracts, trading via ET cannot take place until registries are established. Action to advance JI and CDM projects can be taken immediately, and the latter is of particular interest as crediting can begin starting in 2000. The Table considered a framework for reporting, verifying, and certifying projects in the near term. The purpose of this initiative would be to enable Canada to gain early experience with the CDM and JI ; build capacity for future action ; and bank credits for future use. The Canadian government could potentially offer guarantees to private sector firms participating in this initiative. As such, this proposal may need to be integrated with current work on Credit for Early Action.

b) Registries

An international consensus appears to have formed calling for Parties to establish national systems for recording their assigned amounts and tracking emission unit trading and holdings by the Party (national government) and legal entities. Integrity of the tracking system would be advanced by assigning unique serial numbers to each emission unit, whether they are held by the national government, allotted to entities, created through enhancement of carbon sinks or acquired through international trade. Standardization across domestic registry designs would facilitate international trading. Several Parties may wish to jointly operate a domestic registry system. National registries should allow both domestic and foreign entities to establish accounts and data should be publicly available. The Table noted that it might be appropriate to establish guidelines defining minimum standards for the design and operation of registries.

If a DET system is adopted, domestic registries must be designed to facilitate interface with users and with foreign registries. The registries will include records of all transfers of AAUs, ERUs and CERs reported by Parties in their national reports and a record of assigned amounts held by each Party in its national account. It would interface with the database containing each Party's annual emissions as reported to the CoP under Articles 5 and 7. The experience of the GERT and PERT trading programs in Canada offer useful experience in establishing and operating registries.

Each year, the registries used by each country (or group of countries) would be balanced to verify correct double-entry accounting by Parties for all emission unit transfers. At the end of each commitment period, compliance reconciliation would occur and emission units would be surrendered (or simply deleted) from each national account to cover emissions during the commitment period. This would likely involve a "true-up" period during which additional transactions would be allowed for purposes of compliance.

c) International Trade Issues, Treatment of Multinational Firms

Because international trade is a major concern to Canada, the Table identified this topic area as one in urgent need of further analysis. Three major areas of concern were highlighted :

1. The linkage between use of the Kyoto Mechanisms and the broader system of rules governing international trade. Specifically, the interaction with World Trade Organization rules and preferential treatment (e.g. subsidies, trade barriers) for domestic industries.

2. Competitiveness of Canadian industry and Canadian emissions trading policies (both domestic and international trading) in light of actions taken by the United States.

3. The relationship between use of the Kyoto Mechanisms by Canadian entities and the status of Canada's compliance with its Kyoto Protocol Commitments.

The treatment of multinational firms is another topic that introduces significant complications and risks. A guiding principle of the World Trade Organization is that a country should not discriminate between its trading partners or between its own and foreign products, services or citizens. In terms of a domestic emissions trading system this would imply that any allocation of

Canada's assigned emissions budget to firms within its borders should not discriminate against non-Canadian or multi-national firms operating in Canada. The Table felt that WTO matters should be more closely examined to determine their implications for multinational firms under domestic and international emissions trading systems.

Issues related to trade between the Canada and the U.S., especially trade in energy products, should be evaluated in detail to fully understand the implications between emissions trading and product trading.

Multi-national companies will undoubtedly want to engage in intra-company trading among their facilities located in different Annex I countries. Like any other international trade involving the Kyoto Mechanisms, a transfer by a multinational is effective for compliance purposes only when it is registered with the governments of the Annex I Parties involved and only when those Parties make proper adjustments to their accounts in the international registry.

Some have proposed that Canadian entities should be required to obtain government approval before exporting (selling or transferring) parts of assigned amounts. Such a process would represent an additional layer of complication, cost and uncertainty and would run counter to the goal of seamless interface between domestic and international trading. Canada's overall compliance position is not harmed by the sale of assigned amounts as long as a corresponding emissions cut in Canada (defined as a cut under the baseline and inventory processes applied to Canada in the Kyoto Protocol) is made by the entity that wishes to make an international sale. Proposals to interfere with the market should be evaluated by comparing their incremental benefits, if any, relative to their costs.

6.2 Implications for Canada's National Implementation Strategy

The design and operation of the Kyoto Mechanisms introduce numerous important implications for Canada's National Implementation Strategy. Some of the most important issues are listed below.

Important Issues Needing Further Analysis

- International trade issues
- Competitiveness
- Linkages between entity-level use of the Kyoto Mechanism and Canada's compliance status.

Implications of Kyoto Mechanism Rules on the Domestic Economy and the Private Sector

- Supplementarity : effects of quantified caps on use of the Kyoto Mechanisms
  - Translating the limits to the private sector
  - Economic impacts of a binding limit
- Liability : implications of Party-level liability rules on entities
- Other rules that could reduce domestic flexibility.

Preparing for a Kyoto Mechanisms Regime

- Domestic credit for early action program

- Targeted countries for CDM and JI projects
- Building private sector capabilities by sharing ideas and experience with the Mechanisms and by showing leadership
- Registry design and operation
- Policy design activities and administrative systems in national and provincial governments
- Understanding baselines and additionality : workshops, practical examples and research
- Carbon sinks : definitions, measurement methodologies, monitoring.

The Table recognized that many issues related to developing countries should be further analyzed as it is critical to help build developing country capacity to use the Mechanisms. The Table noted that the Canadian International Development Agency, the Department of Foreign Affairs and Trade, as well as the Global Environment Facility, could play an important capacity building role and could help to assure an equitable distribution of project benefits among developing countries.

Appendix A : Annex B countries and their GHG emission reduction commitments under the Kyoto Protocol

Quantified Emission Limitation or Reduction Commitment	(% of base year)
Australia	108
Austria (EU)	92
Belgium (EU)	92
Bulgaria*	92
Canada	94
Croatia*	95
Czech Republic*	92
Denmark (EU)	92
Estonia*	92
European Community	92
Finland (EU)	92
France (EU)	92
Germany (EU)	92
Greece (EU)	92
Hungary*	94
Iceland	110
Ireland (EU)	92
Italy (EU)	92
Japan	94
Latvia*	92
Liechtenstein	92
Lithuania*	92
Luxembourg (EU)	92
Monaco	92
Netherlands (EU)	92
New Zealand	100
Norway	101
Poland*	94
Portugal (EU)	92
Romania*	92
Russian Federation*	100
Slovakia*	92
Slovenia*	92
Spain (EU)	92
Sweden (EU)	92
Switzerland	92
Ukraine*	100
United Kingdom of Great Britain and Northern Ireland (EU)	92
United States of America	93

***Countries that are undergoing the process of transition to a market economy**

Appendix B : Background

International Context

- The three main negotiating blocks are the "Umbrella Group" (Canada, the U.S., Russian Federation, Ukraine, Norway, Japan, Australia, New Zealand and Iceland), the "EU+", which includes several central European countries with economies in transition, and the G-77/China.
- European Union members have agreed to be jointly responsible for their overall commitments, and have formed a cooperative "bubble". The EU has reallocated the collective 8% below 1990 emission cut to allow some countries (e.g. Ireland, Portugal) to increase emissions above 1990, while others (UK, Germany) will make larger cuts. In effect, a large international emissions trade has already occurred due to this reallocation.
- Article 4 of the Protocol provides for the EU bubble, and such "bubbling" may hold some appeal for members of the Umbrella Group.
- The EU's current emissions are now roughly equal to 1990 levels. Since the 1980s the UK has been making large shifts from coal to gas-fired electric power generation, and the unification of Germany allowed for large emission reductions in the former East Germany (i.e. East German "hot air").
- Countries in transition to a market economy tend to realize major emission reductions due to more efficient energy systems. If Poland, Hungary and other central European countries join the EU, they may bring significant emission surpluses into the EU bubble.
- Russia and Ukraine are likely to have large surpluses of assigned amount. Economic recession and restructuring make it likely that their emissions during 2008-2012 will be well below their Kyoto emission caps.
- South Korea, Turkey and Mexico are the only OECD countries that have not taken on Annex B emission reduction commitments.
- While their per capita emissions are only 10% to 15% of those of Canada, emissions from both China and India are growing rapidly. China is already the world's second largest source of greenhouse gases.

Existing Experience with Emissions Trading :

Real-world experience with large-scale emissions trading programs for selected sectors has proven that clearly defined emission limits and strong environmental monitoring and enforcement systems, when combined with a standardized emissions trading instrument, can produce :

- large emission cuts that are well-documented
- stronger compliance results due to mandatory measurement systems and clear penalties
- emission reductions occurring more quickly than mandated
- far lower overall compliance cost compared to less flexible regulations
- clear incentives to devise better, low-cost pollution control techniques

International emissions trading brings a whole new level of complexity and political, trade and economic dynamics that may work against realizing all the gains which economic theory

suggests should be available.

Emissions trading markets have yielded public prices, active trading, competitive markets and participation by numerous intermediaries. Trading encourages those who can cut pollution at lowest cost to do more of it, and provides a clear, profit-motivated incentive to devise new cost-effective pollution control technologies. In effect, emissions trading puts a price on what had been treated as an unlimited and zero price resource. This corrects what economists call a "market failure", which occurs when the full effects of consumer and industrial activity, including external effects such as pollution, are not taken into consideration. By beginning the process of limiting overall greenhouse gas emissions and allowing flexibility in achieving the limits, the Kyoto Protocol helps establish the "missing market" for use of the earth's limited atmosphere.

Trading has helped improve a variety of pollution problems such as lead in gasoline, urban smog and acid rain. The trading provisions of the Montreal Protocol (which phased-down production of substances that deplete the stratospheric ozone layer) provide precedent with flexible regulations at the international level. The tradeable permits approach has also proven successful in other natural resource management systems, including fisheries management.[18]

Alternatives to tradable permits, needed in cases like GHG emissions where emissions are not so tidily captured within a few sectors, have been only modestly developed so far – however they represent the prototypes for JI, CDM and domestic project-based trading. Canada's experience with such project-based emission trading for various pollutants has grown in recent years due to the introduction of the Pilot Emission Reduction Trading (PERT) program and the recent Greenhouse Gas Emission Reduction Trading (GERT) program. In addition, some Canadian companies have already executed international trades in greenhouse gas credits and ground-level ozone precursors. Nevertheless, it is important to begin building deeper and broader experience with these Mechanisms. The Activities Implemented Jointly pilot phase, under the UN-FCCC, has provided a process for Canadian government agencies to begin preparing to support participation in the international flexibility Mechanisms provided by the Kyoto Protocol. Organized exchanges in the UK, Australia, the US and Canada have expressed an interest in hosting markets for trading in greenhouse gas emission credits. These public markets will help provide price transparency, market functionality and competitiveness and will help bring about lower transaction costs. in addition, a number of brokers and other financial institutions are now conducting greenhouse gas trading, and British Petroleum is currently operating a in-house greenhouse gas trading program for selected facilities around the world. The Table noted the desirability of having a successful carbon credit exchange within Canada.

Mechanics of DET :

Both EU and Umbrella Group (UG) acknowledge the desirability of allowing entities (such as

[18] See, for example : Calman, 1997, for a review of New Zealand's tradeable fishing quota system ; Lee (1996) for a discussion of trading under Montreal Protocol ; U.S. Environmental Protection Agency (1985) for a discussion gasoline lead content trading ; Environmental Defense Fund (1997) for a discussion of the results of the U.S. sulfur dioxide allowance system ; and South Coast Air Quality Management District (1999) for a discussion of the results of the Los Angeles RECLAIM program for reducing urban smog.

industrial companies, government operations, NGOs, financial organizations, individuals) to directly participate in emissions trading. Many countries, including Canada, are actively considering methods for devolving portions of their national emission budget and emission reduction responsibilities to entities as a means for managing a relatively large share of their overall compliance strategy. The logic of this "entity level" trading is to allow those closest to the problem to provide low-cost solutions that best fit their individual circumstances.

If domestic emissions trading (DET) systems are employed, the following offers a summary of the essential mechanics. The reader will note that these mechanics are fundamentally the same as the process established for Parties under the Kyoto Protocol.

1. Determine portion of overall national emission target to be managed at entity level.
2. Assign emission targets for individual emission sources and/or groups of sources.
3. Establish a registry, allocate emission units to regulated sources (a variety of means for doing this are possible) and establish methods for generating credits outside the regulated sectors.
4. Monitor emissions of regulated sources, document and monitor emission reduction initiatives.
5. Each source must hold enough emission units to net out its emissions ; those who make extraordinary emission cuts can sell to those who face higher emission reduction costs.
6. Conduct periodic compliance checks, undertake enforcement responses if necessary.
7. Establish methods for assuring linkage with international trading.

As is the case for Parties, entities could be allowed to directly use ET and JI. They may also be allowed to earn newly generated "credits" by enhancing carbon sinks, or cutting emissions through CDM projects undertaken in developing countries that cause emissions to be lower than they otherwise would have been.

Assessment of Canada's Situation :

Canada's largest emissions sources of greenhouse gases are transport (27%), industrial (20%), electricity generation (17%), fossil fuel production (12%), non-energy sources (including cement and lime production and soil erosion) (12%), residential (8%) and commercial (5%) (Canada's Energy Outlook, 1996).

In 1995 Canada's total GHG emissions were 9% above 1990 levels. The most recent projections indicate that if Canada continues on its recent growth path and introduces no new climate related programs, emissions in 2010 will be 703 million metric tonnes CO_2 equivalent, which is 140 million metric tonnes (25%) above Canada's Kyoto target (Natural Resources Canada, October, 1998). This 140 million tonne gap between "business as usual" emission levels for 2010 and the Kyoto target is often used to characterize the scale of Canada's environmental challenge under Kyoto. A very rough approximate measure of the economic scale of the challenge can be formed using estimated carbon market prices from the low and high end of the middle forecast range of market prices[19] -- $11.50 to $23 per tonne CO_2. (At US$1 = C$1.4 these prices convert to

[19] Prices are for year 2010 in current dollars. They derive from various economic models that assume relatively unrestrained international trading, and also reflect the models reviewed and estimates provided by a group of North American experts convened by the Climate Change Economic Analysis Forum, May 19-20, 1999 in Montreal. It

US$8.21 to US$16.42 per tonne CO_2 or US$30 to US$60 per tonne carbon). Applying these scenario prices as a measure of overall per-ton compliance costs is effectively the same as assuming a flat abatement cost curve, with the hypothetical prices reflecting a composite of the cost of producing domestic emission reductions and the price of emission units acquired internationally. Using these hypothetical prices as the per-ton cost figure and multiplying them by the 140 million tonne "gap" yields a scenario of Canada's annual "compliance cost" in the range of C$1.6 billion to C$3.2 billion, if emission trading is implemented effectively.

Bear in mind that the above estimates are driven entirely by the assumptions provided. They also ignore the value of the benefits of avoiding climate change as well as any ancillary economic (e.g. lower energy bills) or environmental benefits (e.g. cleaner urban air) that may be realized from lowering net greenhouse gas emissions.

To take this hypothetical example further, if Canada can meet its Kyoto commitment while taking advantage of flexibility to drive its per-tonne costs down from $23 to $11.50, $1.6 billion per year would be freed up for other needs.[20]

Consider further a hypothetical scenario where Canada uses the Kyoto Mechanisms to meet 35% of its emission reduction responsibilities through reductions made abroad. (This hypothetical percentage is similar to the ratio of imported goods and services to Canada's gross national product). In this scenario emission reduction units representing a total of 49 million metric tonnes CO_2 would be acquired per year. Using the above prices, this would entail a price tag of $563 million to $1.13 billion per year for international acquisition of emission units. If those 49 million tonnes were split equally among acquisitions via ET+JI and the CDM, five-year total outlays for acquired emission units would be $1.4 to $2.8 billion for ET+JI and $1.4 to $2.8 billion for CDM.

Table A1 summarizes the implications of these scenarios. It should be noted that these are only scenarios, and that the numbers used at each stage are impossible to predict with accuracy. Also note that the number presented as the annual "average" for outlays on CDM projects is simply the five-year total outlay scenario value divided by five, when in fact outlays the CDM can be spread out over many years, and CDM credits can begin accruing in year 2000. Thus, even if these five-year CDM value totals were realized, the actual annual flows may be somewhat lower.

---

should be noted that the U.S. White House used a top-down assessment that yielded prices of US$18-$23 per tonne carbon (see Council of Economic Advisors, 1998) and a leading market participant uses a bottom-up approach to yield a projection of US$20 per tonne carbon (see Sandor and Skees, March, 1999).

[20] The presented price and cost numbers are in Canadian dollars. Use of US dollar price quotes appears to be an emerging convention in the carbon market. The reader should also note that emissions are sometimes reported in tonnes of carbon, not carbon dioxide. One tonne of carbon emissions is equal to 3.664 tonnes of CO_2.

Table 2 : One Scenario of the Five-year Total Value of Canada's International GHG Emissions Trading

Scenario assumptions :

1. Canada's emission cut is characterized as 140 million metric tonnes CO_2 per year.
2. CO_2 emission unit price are C$11.50 to C$23.00 per tonne (US$30-$60 per tonne of carbon).
3. Canada's meets 35% of its emission reduction commitment through international acquisition of emission units. Total acquisitions are 49 million tonnes per year.
4. Fifty percent of international emission acquisitions are ET+JI. 50% are from CDM (24.5 million tonnes each).

	Assumed emission unit prices	
Five-year total outlays on :	CDN$11.50/t CO_2	CDN$23/t CO_2
ET + JI (122.5 million tons)	$1.4 billion	$2.8 billion
CDM (112.5 million tons)	$1.4 billion	$2.8 billion
Annual average over five years	$280 million/year for each	$560 million/year for each
Average Total Annual outlay, all international acquisitions	$560 million to $1.1 billion	

Table A2 shows projected surpluses and shortfalls for 2010, where the emission gap is defined as the difference between projected emissions and a Kyoto target, for selected countries. The country's share of total Annex B 1990 CO_2 emissions is shown in parentheses. For the U.S., Canada and Russia a range of projected gaps is shown as a variety of estimates have emerged. The numbers do not include projected emission impacts of land use changes.

It is not appropriate to think of those countries that are projected to have a surplus as the sole sellers. Nor is it appropriate to assume that surplus countries will be able to dictate market prices. The universe of all suppliers of emission reductions is likely to include thousands of entities in Canada and abroad, individual sink enhancement projects and CDM projects. If a DET system is employed certain individual Canadian entities will be emission unit exporters. And while the conventional wisdom suggests that Canada will be a net importer of emission units (reflecting the assumption that emission reductions will be less costly abroad), another school of thought holds that responsiveness to price signals from the carbon market, combined with Canada's large forest and agricultural lands that could be used to enhance sinks, could make Canada a net exporter of emission units.

The total quantity of net GHG emission reductions required from those countries projected to have a shortfall (applying business as usual projections) is estimated to range from 3,000 to 3,500

million metric tonnes CO_2 equivalent ($MMTCO_2E$). Using the $11.50 to $23 per tonne CO_2 prices cited above, the compliance budget for a 3,000 $MMTCO_2E$ global cut would range in value from C$17 billion to C$35 billion per year.

Taking these scenarios further, if the Kyoto Protocol's environmental objectives can be achieved and the flexibility Mechanisms can help drive the cost down from C$23 per tonne CO_2 to $11.50 per ton, global compliance cost savings would be as much as C$17 billion per year.

Table 3 :
Projected emission account shortfalls and surpluses, calculated as the difference between projected "business as usual" emissions and the Kyoto target
(in million metric tonnes CO_2 equivalent)
(share of Annex B CO_2 emissions shown in parentheses)

Shortfall		Surplus	
US (36.1%)	1739-2200	Russian Federation (17.4%)	129-469
Japan (8.5%)	305	Ukraine (6.6%)	138
European Union (24.2%)	163		
Canada (3.3%)	140-185		
Australia (2.1%)	85		

Early estimates of the potential scale of the CDM envision the annual tonnage flows to range from 350 to 1,750 million tonnes CO_2 per year, which would be roughly 10% to up to 50% of the total demand for reductions (See Vrolijk, 1999).

Using a lower–end scenario of 400 million tonnes per year and the permit prices used above, total flows through the CDM for credits to be used during the first five -year commitment period would range from CDN$23 billion to CDN$46 billion, which would be CDN$4.6 to CDN$9.2 billion per year if averaged over five years.

The actual extent to which Canada and its businesses will use the Kyoto Mechanisms to acquire emission units abroad depends on the design of domestic programs (e.g. does the government conduct all trading or are individual business directly involved in the market?), its need for external carbon credits (driven by emissions growth, amount of domestic reductions that are recognized, such as soil sinks, the costs of domestic reductions) and the ability to effectively use the Mechanisms. It is important for Canadian entities to gain experience with each of these Mechanisms. Canada's strategy to build access to the markets can include taking advantage of strong links already in place in the commercial sectors as well as intergovernmental linkages established by CIDA, DFAIT, and bi-lateral agreements.

The report on market intelligence prepared for the KM Table's Working Group 2 examined perceptions of the CDM and JI among selected Canadian businesses. Company representatives were selected based on their presumed knowledge of the subject. It found that uncertainties about trading system rules and project development issues such as : obtaining approvals from involved countries and international agencies, and start-up costs are thought to be major barriers

to proceeding with the project-based trading Mechanisms. In addition to these "process" challenges, difficulties in dealing in foreign cultures and political/legal and business systems compound the challenge. The report concluded that Canadian businesses have, in principle, a high level of interest in the Kyoto Mechanisms, and that the main driver of participation would be credit for early action.

Appendix C : Terminology

Abatement cost : Cost of reducing GHG emissions, often expressed in US$ per tonne of CO_2 equivalent.

Additionality : Although there is no universally accepted definition, in general, it refers to whether emission reductions in project-based systems would have occurred in the absence of the project. Additionality has also been used to refer to whether the project itself would have occurred in the absence of a commitment to reduce emissions, and whether the project would have occurred in the absence of special financing (often referred to as "financial additionality").

Allowance : Tradable emission units that are portions of an overall emissions budget (assigned amount). Allowances for GHGs may be denominated in metric tons CO_2 equivalent.

Assigned amount : The commitment of an Annex B country, expressed in tonnes of CO_2 equivalent, that corresponds to the total emissions allowed for the commitment period. The sum of assigned amounts for Annex B Parties corresponds to a reduction of their overall GHG emissions by 5.2%, compared to 1990 levels, for the first commitment period 2008 to 2012.

Banking : Saving emission units for the purpose of selling or using them in a future commitment period.

Baseline : A reference case emission level for a project or entity. Emission reduction credits are often defined as the difference between the "without project" or "without action" emissions reference case and the actual level of emissions occurring after emission reduction actions (e.g. individual projects or entity-wide actions) are implemented.

Borrowing : The use of a part of a future-period emission budget in an earlier period.

Bubble : A group of countries or entities that operate under a shared overall emission limit. Article 4 of the Kyoto Protocol recognizes the right of country groups (e.g. the European Union) to commit to and reallocate a collective emission target under such a bubble.

Cap : An overall quantified emission limit that can be subdivided among countries or entities. The sum of allowed emission levels across emission sources (countries or entities) equals the total emission level set by a cap.

Clean Development Mechanism (CDM) : the Kyoto Mechanism that allows for the issuance of certified emission reductions (CERs) reflecting reductions made by individual projects in Non-Annex I countries. CERs can be used by Annex I parties to achieve their commitments established under Article 3. Investments in Non-Annex I countries are to contribute towards sustainable development in the country that hosts CDM projects (see Article 12 of the Kyoto Protocol).

Certified Emission Reductions (CER) : Emission reduction units produced by Clean Development Mechanism projects.

Compliance : a status achieved when after-trading, holdings of emission units (i.e., assigned amount corrected) equals or exceeds a country or entity's actual GHG emissions.

Conversion factors : numerical values used to transform various greenhouse gases into carbon dioxide equivalent (which is used as the common unit of emissions measurement). The Kyoto Protocol uses 100-year relative global warming potential values to convert gases to CO_2 equivalent.

Credits : tradeable instruments reflecting emission reductions produced by emission reduction projects.

Emission Reduction Units (ERU) : tradeable instruments reflecting emission reductions resulting from joint implementation projects in Annex I countries. ERUs can be added to the investing country's assigned amount. The same amount is then subtracted from the assigned amount of the host country, such that the total Annex I assigned amounts remain unchanged.

Emissions Trading : market-based systems intended to allow multiple sources of pollution to collectively arrive at a lower total cost for meeting an overall emission reduction objective. Emission trading allows sources to choose between reducing their own emissions or outsourcing their emission reduction obligations by purchasing excess emission reductions produced by others. Two widely referenced forms of trading are "open market" or credit based systems, (which allow for generation of reductions, on a case-by-case basis, at any location) and "cap and trade" or allowance-based systems, which set a fixed overall emissions limit for covered sources and allows trading among those sources. The Kyoto Protocol represents a hybrid of these two approaches.

Emission units : a generic term used in this report to describe the various forms of tradeable instruments that give the holder the authority to emit one metric ton of carbon dioxide equivalent. The term is intended to be a convenient label for referring to any form of emission credits or allowances, including parts of assigned amounts (PAAs), emission reduction units (ERUs) and certified emission reductions (CERs).

Fungibility : free interchangeability of emission units at full value, regardless of the type (PAA, ERU or CER) or source (country, entity or project).

International Emissions Trading (IET) : (referred to in this document as "Emissions Trading" among Annex B countries) the transfer of parts of assigned amounts among Annex B Parties as established in Article 17 of the Kyoto Protocol. Sometimes also referred to as trading in emission allowances that represent parts of national emission budgets.

Joint Implementation (JI) : as established by Article 6 of the Kyoto Protocol, this mechanism allows for the transfer of "emission reduction units" (ERUs) generated by individual emission reduction or sink enhancement projects undertaken in an Annex I country. Each tonne of exported ERUs causes an equivalent reduction in the assigned amount of the Party that hosts the JI project that produces the exported units, while simultaneously increasing the assigned amount of the Party that acquires the ERUs.

Leakage : a reduction in the overall effectiveness of GHG emission reduction or sink enhancement efforts as a result of displacement of activity that causes an increase in net emissions at another location.

Liability : in the context of international emissions trading, the process used to assign responsibility for instances where the quantity of sales of parts of assigned amounts contributes to a Party being out of compliance. Seller liability would place responsibility

for redressing such excesses on the Party that made excess sales. Buyer liability would place responsibility on the Parties that acquire assigned amounts from the Party that made excess sales. Various proposed hybrid liability systems would place responsibility on either or both seller and buyer depending on circumstances.

Monitoring : periodic or continuous measurement of emissions or emission reduction or sink enhancement activities.

Offset : a generic term used : (1) as a verb to describe emission reduction or sink enhancement actions undertaken at another time or place for the purpose of negating the environmental impact of emissions released by the entity that undertakes the offset ; or (2) a term used as a noun to describe an instrument that is acquired for the purpose of negating the environmental impact of an entity's emissions.

Party : a country as represented by its national government. Countries become party to the United Nations Framework Convention on Climate Change by becoming a signatory, while becoming a Party to the Kyoto Protocol requires signing and ratification.

Project-Based mechanisms : the Clean Development Mechanism and Joint Implementation, which both involve generation of tradeable emission units through individual emission reduction and/or sink enhancement projects.

Review : Process by which compliance of the Party is assessed. The first review will occur subsequent to the 2012 end of the first commitment period.

Sink : biological systems, such as forests and soils, that have the capacity to remove (absorb) and store (sequester) carbon dioxide from the atmosphere.

Source : any process or human activity that emits greenhouse gases (GHG).

Supplementarity : the concept of limiting the acquisition of emission units so that use of Kyoto Mechanisms is "complementary" to actions taken domestically to reduce net emissions. Each of the Articles establishing the Kyoto Mechanisms makes reference to the concept, which may or may not be defined in quantitative terms.

Verification/ certification : a process carried out by independent entities for the purpose of confirming the effectiveness of emission reduction projects, as required for the CDM under Article 12.7. Certification is an attestation by an operational entity (such as an inspection agency or accounting firm) that emission reductions produced by a CDM project are valid.

References

Climate Change Economic Analysis Forum, "Understanding International Contexts for Canada's National Implementation Strategy", Draft Background Paper on Kyoto Mechanisms. (Prepared by Economic Analysis Forum and AGRA Earth & Environmental Ltd.) May 19-20, 1999. Montreal.

Environmental Defense Fund, "More Clean Air for the Buck : Lessons from the Acid Rain Emissions Trading Program", November 1997.

"Individual Transferable Quotas for Fisheries Management : the New Zealand Experience", presentation by Stuart Calman, New Zealand Ministry of the Environment, to the Inaugural Session of the Greenhouse Gas Emissions Trading Policy Forum, June 1997, Chicago.

Lee, David, in "Ozone Protection in the United States : Elements of Success", Elizabeth Cook, ed., World Resources Institute, 1996.

Natural Resources Canada, "Canada's Emissions Outlook : An "Events-Based" Update for 2010", Working Paper, Energy Forecasting Division, October, 1998.

Natural Resources Canada, "Canada's Energy Outlook : 1996-2020", Energy Forecasting Division, April, 1997.

Sandor, Richard and Skees, Jerry, "The Emerging Carbon Market Offers Major Opportunity for U.S. Farmers", *Choices*, March, 1999.

Sandor, Richard and Walsh, Michael, "Market Architecture, Quality Control and Performance Risk : Can the Commodity and Capital Markets Inform the Design of the Clean Development Mechanism", prepared for the Brazil/U.S. Aspen Global Forum on the Clean Development Mechanism, October 9-12, 1998, Aspen, Colorado.

South Coast Air Quality Management District, "RECLAIM Program Three-Year Audit and Progress Report", May 8, 1998.

U.S. Council of Economic Advisors, "The Kyoto Protocol and the President's Policies to Address Climate Change : Administration Economic Analysis", July, 1998.

US Environmental Protection Agency Office of Policy Analysis "Costs and Benefits of Reducing Lead in Gasoline – Final Regulatory Impacts Analysis", 1985.

Vrolijk, Christiaan, "The Potential Size of the CDM", Global Greenhouse Emissions Trader, Issue 6, February, 1999, United Nations Conference on Trade and Development.

Walsh, Michael, "Potential for Derivative Instruments on Sulfur Dioxide Emission Reduction Credits", *Derivatives Quarterly*, Fall 1994.

List of the Kyoto Mechanisms Table reports

Applied Research Consultant Market Intelligence for Joint Implementation and the Clean Development Mechanism. Ottawa, April 1999

Braatz, Barbara and Catherine Leining. Report on Project Eligibility : Options for Defining Additionality and Baselines Under Article 6 and Article 12 of the Kyoto Protocol. Toronto, ICF Kaiser, April 1999. 45 pp.

Environmental Financial Products L.L.C., Winnipeg Commodity Exchange and Cowan Research. International Emissions Trading (IET) Design Options Principal Methodological Issues. Chicago, May 1999

Environmental Financial Products L.L.C., Winnipeg Commodity Exchange and Cowan Research. Options and Recommendations—Clean Development Mechanism and Joint Implementation Transaction Process. Chicago, April 1999.

IISD Business Trust, "Accountability", a Report to Working Group 2 on Joint Implementation and Clean Development Mechanism, May 1999.

Singleton, Bill. The Potential Supply of Emissions Reductions from Projects Implemented under Joint Implementation and the Clean Development Mechanism. Hull, April 1999